

EXHIBIT 8

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Not Reported in F.Supp., 1995 WL 510304 (E.D.Pa.), 41 ERC 1417

(Cite as: Not Reported in F.Supp.)

▷

U.S. v. Atlas Minerals and Chemicals, Inc.
E.D.Pa., 1995.

United States District Court, E.D. Pennsylvania.
UNITED STATES of America

v.

ATLAS MINERALS AND CHEMICALS, INC., et
al.

v.

R. Emory MABRY, et al.
Civ. A. No. 91-5118.

Aug. 22, 1995.

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CAHN, Chief Judge.

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IV.

RECOVERABILITY OF PAST COSTS.

INTRODUCTION

*1 This cost recovery and contribution action was brought under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 *et seq.* and its

Pennsylvania counterpart, the Hazardous Sites Cleanup Act ("HSCA"), 35 P.S. § 6020.101 *et seq.* This court has jurisdiction pursuant to 28 U.S.C. § 1331, 28 U.S.C. § 1367, and 42 U.S.C. § 9613(b).

This litigation arises from the contamination of the Dorney Road Landfill (the "Site") which is located

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in Mertztown, Pennsylvania. The Site operated as an open dump between 1958 and 1978 and was placed on the National Priorities List ("NPL")FN1 in 1984. In 1986, the Environmental Protection Agency ("EPA"), in conjunction with the Pennsylvania Department of Environmental Resources ("DER" or "PaDER"), initiated a Superfund-financed emergency removal action at the Site to address immediate environmental concerns. *See* 42 U.S.C. § 9604, 9611. The removal action involved regrading the Site and constructing on-site ponds to control surface water run-off.

In 1991, the United States filed suit against Atlas Minerals and Chemicals, Inc., Caloric Corporation (now Amana Refrigeration, Inc.), East Penn Manufacturing Company, Inc., Exide Corporation, GAF Corporation, Garden State Tanning, Inc., General Electric Company, The Glidden Company, Mack Trucks, Inc., and The Stroh Brewery Company (collectively, "Defendants") under 42 U.S.C. § 9607, seeking to recover the response costs which EPA incurred in conducting the removal action. The United States alleged that the Defendants had generated hazardous waste that was disposed of at the Site, and therefore were liable for the cost of its cleanup.

Pursuant to 42 U.S.C. § 9606, EPA has issued four unilateral administrative orders (the "unilateral orders") with regard to the Site. The unilateral orders require the Defendants to implement, at their own expense, the permanent remedy which EPA has selected for the Site. The most significant component of the remedy involves construction of an impermeable multi-layer cap over the landfill in accordance with Pennsylvania landfill closure regulations. In addition, the remedy requires the elimination of on-site ponds, regrading, groundwater monitoring, installation of a perimeter fence, run-on/run-off controls, and the construction of seven acres of wetlands adjacent to the Site.

In 1992, Defendants (now "Third-Party Plaintiffs") filed third party complaints against approximately sixty Third-Party Defendants, alleging that the Third-Party Defendants are liable as generators or transporters of waste containing hazardous substances. *See* 42 U.S.C. § 9607(a)(3) & (4). Third-Party Plaintiffs seek contribution, 42 U.S.C. § 9613, and recovery of anticipated response costs, 42 U.S.C. § 9607(a), from the Third-Party

Defendants. Third-Party Defendants are, for the most part, generators or transporters which have disposed of large amounts of municipal solid waste ("MSW") or "MSW-like" waste at the Site. Third-Party Plaintiffs expect the total cost of cleanup to be close to \$25 million.

*2 The United States entered into a settlement with the ten Third-Party Plaintiffs, which is embodied in a consent decree entered pursuant to this court's March 1, 1994 order. The consent decree provides, *inter alia*, that the Third-Party Plaintiffs will reimburse the United States for past response costs.

In addition, all but two of the Third-Party Defendants either have been dismissed from this action or have settled with Third-Party Plaintiffs. Magistrate Judge Arnold Rapoport acted as the settlement judge, and the court acknowledges his herculean effort in this regard. What remains before the court is the cost recovery and contribution action between Third-Party Plaintiffs and two of the Third-Party Defendants, Saucony Shoe Manufacturing Company, Inc. ("Saucony") and SCA Services, Inc. ("SCA").

The court held a non-jury trial in the third-party action which lasted approximately fifty days. The court has heard testimony from about 80 witnesses and received nearly 700 exhibits. Now, following exhaustive briefing and oral argument, the court is presented with the task of allocating the cost of cleanup among the parties that remain.

Third-Party Plaintiffs presume that nearly 70% of the cost of the remedy which EPA ordered is linked to the volume of waste present at the Site. Third-Party Defendants counter that it is not the volume, but the toxicity of the waste which caused EPA to mandate the costly multi-layer cap instead of a relatively inexpensive two foot soil cap. Each side has presented the court with a proposed allocation scheme, which the court will discuss in detail.

Saucony and SCA have presented several additional arguments which will affect the share of the cost that will be allocated to them. For instance, Saucony argues that it can not be held responsible for waste disposed by its Kutztown plant prior to 1968, when Saucony acquired the plant through an asset purchase agreement.

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The issue germane to the share of costs to be borne by SCA is the extent of its liability as a transporter of waste. SCA transported a large quantity of MSW for the City of Allentown ("Allentown"), a settling Third-Party Defendant. SCA posits that it can not be held liable for the waste that it transported under its contract with Allentown because it did not select the Site. SCA argues that it used the Site only because Allentown instructed it to do so. Also, SCA contends that its contract with Allentown required it to pick up waste between 11:00 p.m. and 8:00 a.m., and the Dorney Road landfill was the only site in the area that was open at night. In due course, the court will consider these and other contentions which are pertinent to a resolution of the allocation issue.

Whatever allocation method the court adopts in this case, it will be necessary to identify the volume and characteristics of each party's waste. Some parties have entered stipulations as to the total volume of the waste that they disposed at the Site. In the absence of such a stipulation, however, the court must determine volume based on testimony and documents presented at trial. The court's findings as to volume will be approximate in some instances, where the passage of time has eroded the reliability of the evidence presented. Nonetheless, the record provides the court with a reasonably sound basis from which to assess each party's contribution to the Site. The court will also make findings as to the properties of each party's waste.

*3 In accordance with Fed. R. Civ. P. 52(a), the court makes the following:

FINDINGS OF FACT

I. THE DORNEY ROAD LANDFILL

A. SITE DESCRIPTION

1. The Dorney Road Landfill (the "Site") is located along the southwest boundary of Upper Macungie Township in Lehigh County, Pennsylvania. (TPP 126 at 1.)FN2
2. The Site is sometimes referred to as the "Oswald Landfill" or the "Mabry Landfill."
3. The Site is situated approximately 8 miles southwest of Allentown, Pennsylvania and approximately 1.4 miles north-northwest of

Mertztown, Pennsylvania. (TPP 126 at 1.)

4. The Site is comprised of approximately 27 acres. (TPP 126 at 1.)

5. The land surrounding the Site is essentially rural residential and agricultural. Approximately 20 people live within a quarter mile of the site. Three residences are located within 2,000 feet of the Site; one residence is located within 1,000 feet of the Site. The residents of these homes use ground water from private wells for their water supply. (TPP 126 at 4.)

B. SITE HISTORY

6. The Site began operating as a landfill in 1958. (Oswald, Tr. 12/8/93 at 53.)FN3 At that time, R. Emory Mabry ("Mabry"), now deceased, owned the land on which the Site was situated. (Oswald, Tr. 12/8/93 at 51-54.)

7. Waste initially was disposed at the Site in a two-acre iron mine pit which was 25-30 feet deep. (Oswald, Tr. 12/8/93 at 54.)

8. Harold Oswald ("Oswald") began working at the Site as Mabry's employee when the landfill opened. (Oswald, Tr. 12/8/93 at 54.) Oswald operated the Site for Mabry until the mid-1960s. (Oswald, Tr. 12/8/93 at 63.)

9. Mabry kept a notebook (the "Mabry Log") in which he recorded the people and entities that used the Site from May 17, 1965 until January 14, 1967. (TPP 3; Oswald, Tr. 12/8/93 at 101-02.)

10. In 1967, Oswald leased the landfill from Mabry and took over as the sole operator of the landfill. (Oswald, Tr. 12/8/93 at 63.) For the first six months during which Oswald leased the Site from Mabry, Clifford Hill ("Hill") kept the books, including maintaining the log. (Oswald, Tr. 12/8/93 at 64; Hill, Dep. 3/5/93 at 25-26.)

11. In February 1968, Gary Selig ("Selig") became Oswald's partner. (Oswald, Tr. 12/8/93 at 64; Selig, Tr. 12/8/93 at 134.)

12. Selig kept the books for the landfill beginning in 1968. (Oswald, Tr. 12/8/93 at 65.) He kept a notebook (the "Selig Log") from 1968 until 1978

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which shows the amount charged each month to the people and entities that used the landfill. (Selig, Tr. 12/8/93 at 147-50; Selig, Tr. 12/9/93 at 49.)

13. The iron ore pit was filled in 1970 or 1971. Thereafter, waste was placed in three trenches that Oswald and Selig dug at the Site. (Oswald, Tr. 12/8/93 at 64; Selig, Tr. 12/8/93 at 135.)

a. The first trench was roughly 100 to 200 feet long, 15 to 18 feet deep, and 75 feet wide. (Selig, Tr. 12/8/93 at 136.) It was filled around the end of 1972. (Selig, Tr. 12/8/93 at 137.)

*4 b. The second trench, which ran alongside the first trench, became filled in 1974. (Selig, Tr. 12/8/93 at 138).

c. The third trench was approximately 300 to 400 feet long and ran parallel to Dorney Road, about 30 feet from the road. Its width was irregular, but was about 200 feet at its widest points. The third trench became filled in 1978. (Selig, Tr. 12/8/93 at 138-39.)

14. Oswald and Selig continued to operate the landfill until the Site ceased accepting waste in December 1978. (Oswald, Tr. 12/8/93 at 64; Selig, Tr. 12/8/93 at 139.)

15. For purposes of this litigation, the court will refer to the time period during which the Site was in operation, 1958 to 1978, as "the relevant time period."

16. By the time the Site ceased accepting waste, Oswald had covered much of the Site with earth. However, he intentionally left some waste uncovered in order to prevent the Site from being considered a "closed" landfill. (Oswald, Tr. 12/8/93 at 96-97). At least two acres were left with no soil cover whatsoever. (Oswald, Tr. 9/21/94 at 46-47.) Oswald and Selig never properly graded or seeded the Site to control erosion. (TPP 126 at 6; TPD 979 at 2-9.)

17. Edward Reeser ("Reeser") leased the Site from Mabry in 1979 and submitted an application to the Pennsylvania Department of Environmental Resources ("PaDER" or "DER") to expand the Site and continue landfilling operations. (TPD 979 at 2-9, 2-10.) DER denied Reeser's application in 1980

and Reeser withdrew the application in 1981. (TPD 979 at 2-10.)

C. THE GARBAGE

18. Waste was commingled at the Site; no particular type of waste was disposed of in any special location. (Selig, Tr. 12/8/93 at 140-41; Oswald, Tr. 12/8/93 at 56-57.)

19. Two types of waste were disposed at the Site: municipal solid waste ("MSW")FN4 and industrial hazardous waste.FN5 As a landfill which received both MSW and industrial hazardous waste, the Site was a "co-disposal" landfill. (Brown, Tr. 7/14/94 at 25, 55-56.)

D. REMEDIAL ACTIONS AND SITE CONDITIONS

20. In 1970, Oswald obtained a temporary permit to operate a landfill at the Site, but DER requested that he submit a Solid Waste Disposal Site Application for continued operations. (TPD 979 at 2-9.)

21. In June 1977, DER's Division of Solid Waste Management ("DSWM") sent Oswald a notice of violation because Oswald had not complied with submission deadlines in the permit application process. In August 1977, DER advised Oswald to cease landfilling operations by January 1, 1979 and to submit a phase-out schedule for Site operations. In June 1978, DER cited Oswald for improper operations. Oswald notified DER in December 1978 that he would cease landfilling operations. (TPD 979 at 2-9.)

22. In 1979, the United States Congress commissioned a nation-wide industrial waste disposal survey (the "Eckhardt Survey"), which required a number of chemical manufacturers to account for their waste disposal practices dating back to 1950. The Eckhardt Survey identified the Dorney Road Landfill as a site at which industrial waste had been disposed. (Hengemihle, Tr. 8/3/94 at 63.)

*5 23. Based on the Eckhardt Survey, EPA placed the Site on the Comprehensive Environmental Response, Compensation and Liability Act Information System ("CERCLIS"). (Hengemihle, Tr. 8/3/94 at 63; TPD 976, PA at 1.) CERCLIS is

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EPA's comprehensive data base and management system which inventories and tracks releases which are addressed or need to be addressed by the Superfund program. 40 C.F.R. § 300.5 (1994).

24. EPA performs a Preliminary Assessment ("PA") for all sites which are placed on the CERCLIS. The PA is a screening tool which constitutes the first stage of the CERCLA enforcement process. 40 C.F.R. § 300.420(b).

25. EPA performed a PA of the Site in 1980 and, as a result, recommended that a remedial site inspection ("SI") be performed. (TPD 976, PA at 1; *see* 40 C.F.R. § 300.420(a) & (b)(4)(iii).)

26. The SI involves gathering data to augment the information contained in the PA and assessing the extent of the threat posed by the release. 40 C.F.R. § 300.5. Sampling and other data collected in the SI facilitates scoring under the Hazard Ranking System ("HRS"). 40 C.F.R. § 300.420(c)(1). The HRS is the principal mechanism that EPA uses to place sites on the National Priorities List ("NPL"). 40 C.F.R. Pt. 300, App. A § 1.0 (p. 97).

27. The SI performed at the Site confirmed that hazardous wastes had been co-disposed with MSW at the Site. The SI Report noted the presence of: paint and pigment sludges; metal sludges; acid and alkaline sludges; solvents; chemical wastes such as caustics, phenols and metals; asbestos; and ferrous smelting wastes. (TPD 976, SI Report at 4). The SI Report listed heavy metals and phenols as the substances of greatest concern. (*Id.*)

28. The HRS score assigned to the Site was the result of an evaluation of three individual threats: ground water migration, surface water migration, and air migration. EPA assigned the Site an overall score of 46.10. A site which receives an HRS score of 28.50 or higher is placed on the NPL. *See* 40 C.F.R. § 300.425(c)(1).

29. The Site was placed on the NPL on September 21, 1984. 49 Fed. Reg. 37670 (1984).

30. In December 1984, EPA prepared a Remedial Action Master Plan ("RAMP") for the Site. The RAMP summarized all available information and recommended that a Remedial Investigation ("RI") and Feasibility Study ("FS") (collectively, "RI/FS")

be conducted at the Site.

31. The RI/FS was scheduled to be completed by the end of 1986. By January 1986, however, increasing concern about soil erosion and run-off prompted DER to ask EPA to assess conditions at the Site to determine whether immediate action was warranted. (TPD 980 at 7.) EPA approved the use of CERCLA funds up to \$186,000 for an emergency removal action in May 1986. (TPD 980 at 4.)

32. EPA's On-Scene Coordinator ("OSC"), Technical Assistance Team ("TAT"), and Emergency Response Cleanup Services ("ERCS") contractor began the implementation of various measures to control erosion and to temporarily stabilize the Site on June 11, 1986.

*6 33. As part of the emergency removal action, EPA created four rainwater retention ponds in the southwest quadrant of the Site to control surface water runoff. EPA also constructed several swales to control surface water runoff. (TPD 981 at 34; *see* TPD 981 at 42-43 (App. A, Fig. DO-1 & DO-2).) Gullies were filled with clean clay which was found on the Site. The emergency removal action was completed on June 20, 1986. (TPD 981 at 34.)

34. During a follow-up visit to the Site in September 1986, the OSC observed "[a]reas intended for 'ponding' of rainwater holding a remarkable amount of water thereby preventing runoff onto adjacent cornfields." (*Id.*)

35. EPA conducted its RI in two phases, beginning in December 1987 and ending in June 1988.FN6 (TPP 121 at 1-1.)

36. Based on the RI conducted at the Site, EPA concluded that groundwater and surface contamination emanating from the Site posed a threat to public health and the environment. (TPP 121 at ES-8.)

37. Regarding groundwater contamination, the RI revealed that a shallow perched aquifer exists within the waste disposal area at the Site. (TPP 121 at 4-30.)

a. The piezometric surface of the perched aquifer intercepts the base of the retention pond which EPA constructed on the western edge of the Site during

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the emergency removal action; this intersection creates a "groundwater mound." (TPP 121 at 4-35.) The mounded area slopes steeply in all directions away from the ponded area and intercepts the ground surface along the southwestern and southern soil berms. (TPP 121 at 4-35.) The RI concluded that the mounding may have resulted in some lateral migration and, consequently, low level contamination of areas in close proximity to the Site. (TPP 121 at 4-65.) The RI also stated that the groundwater mound appears to cause dilution of on-site leachate. (TPP 121 at 4-65.)

b. A second feature of the perched aquifer is a depression which coincides with the bottom of the iron ore pit. (TPP 121 at 4-35.) The RI stated that "[t]his depression is believed to be the primary discharge point for the landfill leachate." (TPP 121 at 4-65.)

38. The groundwater mound, coupled with the depression in the perched aquifer, created what was referred to during trial as a "bathtub effect." (Wagner, Tr. 2/8/94 at 140; Robertson, Tr. 9/30/94 at 83; Hwang, Tr. 10/4/94 at 70.) The bathtub effect describes the buildup of leachate that occurs when water which percolates into the landfill can only exit the landfill at a centralized location. (Hwang, Tr. 10/14/94 at 182.) The creation of the bathtub effect at the Site was due in part to the EPA-constructed retention ponds which increased saturation at the Site.

39. The RI did not evaluate hydraulic conductivity at the Site. Therefore, the exact rate at which contaminants migrated from the Site into the water table aquifer was still unknown at the time the RI was completed. (TPP 121 at 4-35.)

*7 40. The bathtub effect affects surface conditions in two ways. First, leachate collects in the ponds if the water table rises to a sufficient level. Second, leachate flows laterally and seeps out under the ground surface. (Wagner, Tr. 2/8/94 at 139-141.)

41. EPA found significant health hazards stemming from surface and groundwater contamination. Cancer risks associated with direct contact with surface soil and residential groundwater were found to be derived primarily from the presence of polynuclear aromatic hydrocarbons ("PNAs") and arsenic. (TPP 121 at 6-112.) No significant cancer

risks were found to be associated with direct contact with sediments, and no carcinogens were detected in surface water or seeps. On-site soil contamination was deemed unacceptable primarily because of high concentrations of lead. (TPP 121 at 6-112; *see* TPP 121 at 6-41.) Under future-use scenarios, assuming direct contact with soil and groundwater, non-cancer risks were deemed unacceptable because of high concentrations of lead, chromium, and nickel. (TPP 121 at 6-112.)

42. Based on the RI's assessment of the hazards to human health and the environment present at the Site, EPA determined that an FS was warranted. FN7 (*Id.* at ES-8.)

43. Following the RI, EPA determined that remediation of the Site should be addressed by dividing the Site into two Operable Units. The first Operable Unit ("OU-1") addressed landfill waste and soil contamination. The second Operable Unit ("OU-2") addressed ground water concerns. (TPP 126 at 1.)

44. The FS for OU-1 set out to "develop and evaluate remedial action alternatives to mitigate public health and environmental hazards associated with the dermal contact and incidental ingestion of ... soil, solid waste and surface water ... at the [Site]." (TPP 123 at 1-1.)

45. The FS for OU-1, which was completed in August 1988, set out five remedial alternatives. FN8 (TPP 123 at ES-9 - ES-11.) All five alternatives included construction of a perimeter fence, deed restrictions, runoff monitoring, and groundwater monitoring. (TPP 123 at ES-9 - ES-11.) The alternatives varied significantly, however, in the degree to which each portended to serve the goal of protecting human health and the environment, as well as other criteria:

a. *Minimal/No Action* -- The FS Report noted that a "no action" alternative, involving only the four actions listed above, would provide minimal to no protection of human health and no protection of the environment. (TPP 123 at ES-9, ES-15.) Therefore, this was not considered a viable alternative.

b. *Soil Cover* -- The Soil Cover alternative would include the additional major components of surface water elimination, regrading, runoff controls,

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plus a soil cover. (TPP 123 at ES-10.) The FS Report noted that a soil cover would protect human health significantly by reducing the risk of incidental ingestion and dermal absorption of surface water and solid waste. However, the soil cover would not significantly reduce the leaching of solid waste contaminants to groundwater. (TPP 123 at ES-15.) Therefore, protection of the environment would be minimal. (TPP 123 at ES-9.)

***8 c. Multi-Layer Caps** -- The FS presented two alternatives with a multi-layer cap as a major component: (1) a RCRA-Type Multi-Layer Cap and (2) a Pennsylvania-Type Multi-Layer Cap compliant with Pennsylvania's solid waste regulations rather than RCRA regulations. Like the Soil Cover alternative, both multi-layer caps would involve the major components of surface water elimination, regrading, and runoff controls, but would have the additional major component of a multi-layer cap instead of a soil cover. (TPP 123 at ES-10.) The FS Report noted that both multi-layer caps would virtually eliminate the hazards of direct contact and incidental ingestion of contaminants. Additionally, the impermeable multi-layer caps would reduce migration of contaminants to groundwater. (*Id.*) The major difference between the two types of multi-layer caps is that the PaDER cap would be significantly less expensive than the RCRA cap. (*Id.*)

d. Onsite RCRA Landfill -- This would involve all the major components of the RCRA-type Multi-Layer Cap alternative with the addition of excavation and three-dimensional containment of waste. (TPP 123 at ES-11.) The FS Report noted that this alternative would eliminate human health and environmental risks. (TPP 123 at ES-15.) However, this alternative would require complex design and construction and would take five years to implement. (TPP 123 at ES-12, ES-13.)

e. Onsite Incineration -- This would involve all the major components of the Onsite RCRA Landfill alternative, with the additional component of incineration. (TPP 123 at ES-11.) This alternative would serve the most complete reduction of TMV and would afford maximum protection to human health and the environment, but would take twelve years to implement and would be quite costly. (TPP 123 at ES-11 - ES-15.)

46. The FS identified potential action-specific applicable or relevant and appropriate requirements ("ARARs") for the Site. Once the remedy is selected, action-specific ARARs specify performance levels and provide a basis for assessing the remedy's feasibility and effectiveness. (TPP 123 at 2-3.) Action-specific ARARs are defined as "those requirements that set controls or restrictions on the design, implementation, and performance levels of activities related to the management of hazardous substances, pollutants, or contaminants." (TPP 123 at 2-2.)

47. Among the action-specific ARARs identified for the site were the following:

a. RCRA Subtitle C disposal requirements, which are applicable under 42 U.S.C. § 9604(c)(3)(B). (TPP 123 at 2-9, Table 2-3.)

b. RCRA regulations found at 40 C.F.R. Part 264, which are relevant and appropriate. (TPP 123 at 2-9, Table 2-3; *see* TPD 997 at 2-15.)

c. Pennsylvania Solid Waste Regulations ("PASWR") found at 25 Pa. Code § 75.264, which are relevant and appropriate. (TPP 123 at 2-10 & 2-11, Table 2-3.)

48. In September 1988, EPA issued a Record of Decision ("ROD") for OU-1 ("ROD/OU-1"). The ROD evaluated the potential effectiveness of the various long-term response alternatives endorsed by the FS and selected what the EPA determined to be the best permanent remedy for the site. (TPP 126)

***9 49. The ROD/OU-1 selected the PA-type multi-layer cap:**

This alternative has the same major component and is similar to [the RCRA multi-layer cap] except that the standard for the cap design would be developed in accordance with the Pennsylvania Solid Waste Management Act rather than RCRA guidance. As RCRA closure standards are not applicable at this pre-RCRA site, and the Commonwealth of Pennsylvania has solid waste regulations in place which directly relate to this type of municipal landfill, these state requirements will be followed. Because this site contains hazardous contaminants, the RCRA cap requirements maybe [sic] considered relevant and appropriate. However, the Pennsylvania State Cap also meets these

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requirements.

(TPP 126 at 21.)

50. According to the ROD/OU-1, the Pennsylvania multi-layer cap consists of (from the bottom up) a six-inch gravel gas collection layer, a one foot compacted earth layer, a 50 mil flexible synthetic liner, a synthetic drainage layer, and a two foot loam layer on top to support vegetation. (TPP 126 at 21, 23.)

51. EPA issued three unilateral orders dated September 28, 1990, January 25, 1991, and August 13, 1992 pursuant to CERCLA § 106(a) ("OU-1 orders"), directing the PRPs to implement the remedy it had selected in ROD/OU-1. (TPP 102)

52. On September 18, 1991, EPA issued an Explanation of Significant Differences ("ESD") modifying the remedy selected in ROD/OU-1. The ESD outlined EPA's added requirement that Third-Party Plaintiffs create seven acres of new wetlands at the Site to replace seven acres of existing wetlands that would be eliminated as a result of the implementation of the capping remedy. (TPP 129 at 3.)

53. Pennsylvania law now requires substantially the same multi-layer cap for closure of a hazardous waste landfill that it does for closure of a municipal waste landfill:

a. Both caps must have an impermeable layer; however, the thickness of the layer differs between the two caps:

i. Pennsylvania's Hazardous Waste Regulations require either a two foot compacted clay layer or a synthetic membrane at least 50 mils thick when closing a hazardous waste landfill. 25 Pa. Code § 264.302(a)(4), App. E Table 3.

ii. Pennsylvania's Municipal Waste Regulations, which became effective April 9, 1988, require the use of either a one foot compacted clay layer or a synthetic membrane at least 30 mils thick when closing a municipal waste landfill. 25 Pa. Code §§ 273.234(a)(1) & 273.256 Table I.

b. Both caps must have a drainage layer capable of transmitting flow and preventing erosion of the soil

layer. 25 Pa. Code §§ 264.302(a)(7) & 273.234(a)(2).

c. Two feet of compacted uniform soil must be installed on top of both caps to support vegetation. 25 Pa. Code §§ 264.310(1) & 273.234(a)(3).

d. Vegetation must be planted on top of both caps to prevent erosion. 25 Pa. Code §§ 264.310(4) & 273.235.

54. On September 29, 1994, EPA's Remedial Project Manager notified Third-Party Plaintiffs that EPA anticipated approving their plan to construct a cap using a 40 mil synthetic membrane. FN9 EPA stated:

*10 [T]he landfill cap design will be in accordance with Chapter 273 of the Pennsylvania Municipal Waste Management Regulations. The minimum geomembrane thickness for caps, as stated in those regulations, is 30 mil. Based on my initial review of your 90% design submittal, it appears that a 40 mil VLDPE [very low density polyethylene] geomembrane will be acceptable.

(TPP 1127.)

55. In the fall of 1991, EPA issued a ROD for OU-2 ("ROD/OU-2"). The remedy selected in the ROD/OU-2 involves the provision of wellhead treatment units to surrounding residences for removal of volatile organic compounds and other site-related contaminants, as well as groundwater monitoring. (TPP 144 at AR301273.)

56. EPA issued a unilateral order dated August 18, 1992 pursuant to CERCLA § 106(a) (the "OU-2 order"), directing Third-Party Plaintiffs to implement the ROD/OU-2. (TPP 101)

E. COSTS INCURRED BY THIRD-PARTY PLAINTIFFS

(1) *The United States*

57. On March 1, 1994, this court entered a consent decree between Third-Party Plaintiffs and the United States (the "Consent Decree"). *United States v. Atlas Minerals and Chemicals, Inc.*, 851 F. Supp. 639 (E.D. Pa. 1994); see TPD 1616 (Consent Decree).

58. Pursuant to the terms of the Consent Decree,

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Third-Party Plaintiffs have paid \$1,209,250.00 to reimburse the United States for its past response costs at the Site. (TPP 1035)

(2) *Environmental Resources Management, Inc.*

59. Prior to the issuance of the OU-1 and OU-2 orders, Third-Party Plaintiffs retained Environmental Resources Management, Inc. ("ERM") to assist them in developing remedial design alternatives for the Site.

60. ERM's invoices for June 1989, July 1989, and August 1989 describe the work performed as relating in part to the 1986 emergency removal action. (TPP 2003 at DEF0002532 ("Review of removal action and meeting"); DEF00002525 ("EPA meeting and meeting preparation regarding the 1986 removal project"); DEF0002536 ("Analyzed emergency removal cost and finalized the comment memo").)

61. The ROD/OU-1, specifying the permanent remedy consisting of a Pennsylvania multi-layer cap, was issued in September 1988. (TPP 126) ERM's invoices are for work performed between April 1989 and May 1990. (TPP 1003) The first unilateral order for OU-1 was issued September 28, 1990. (TPP 102)

62. Third-Party Plaintiffs have incurred and paid costs totalling \$38,419.39 for services rendered by ERM. (TPP 2003)

(3) *Nihill & Riedley*

63. Third party plaintiffs employed Nihill & Riedley to identify and track down other solvent PRPs. (Dovell, Tr. 7/27/94 at 140; Dovell, Tr. 8/1/94 at 112-13.)

64. A PRP investigation such as that undertaken by Nihill & Riedley involves activities such as interviewing, deposing, and obtaining declarations from owners, operators, and transporters that can identify PRPs. Such an investigation also involves determining whether the identified PRPs in fact disposed of hazardous substances at the Site, and determining the corporate status of any PRPs that are identified. (Dovell, Tr. 8/1/94 at 11, 37-39, 65-66.)

*11 65. Third-Party Plaintiffs have incurred and paid costs totalling \$77,649.89 for Nihill & Riedley's services in conducting a PRP investigation from November 1991 until October 1992. (TPP 1029)

(4) *Woodward-Clyde Consultants*

66. Third-Party Plaintiffs retained Woodward-Clyde Consultants ("Woodward-Clyde") to perform the remedial design for OU-1 at the Site. (Travers, Tr. 12/13/93 at 47.)

67. Third-Party Plaintiffs' contract with Woodward-Clyde provides that "[a]ll work required to be performed pursuant to the Contract ... shall also comply with the terms of the [OU-1 orders and the ROD/OU-1.]" (TPP 99, Addendum A at GE0012967.)

68. As of February 1995, Third-Party Plaintiffs have incurred and paid costs totalling \$682,348.68 for services rendered by Woodward-Clyde to perform a remedial design for OU-1. (TPP 217-266; TPP 2002.)

69. EPA has approved the work that Woodward-Clyde has performed. (TPP 1039; TPP 1127; TPP 1322; TPP 2004.)

(5) *O'Brien & Gere Engineers, Inc.*

70. Third-Party Plaintiffs retained O'Brien & Gere Engineers, Inc. ("O'Brien & Gere") to perform the remedial design for OU-2 at the Site. (Travers, Tr. 12/13/93 at 48.)

71. Third-Party Plaintiffs' contract with O'Brien & Gere provides that "[t]he Remedial Design is to be performed in accordance with the ground water requirements of the OU1 ROD, the OU2 ROD, CERCLA, the NCP, the Order and the Contract Documents." (TPP 169 at DEF0003571-72 (Scope of Work).)

72. As of February 1995, Third-Party Plaintiffs have incurred and paid costs totalling \$71,651.36, for services rendered by O'Brien & Gere to perform a remedial design for OU-2. (TPP 1031; TPP 2001.)

73. EPA has approved the work that O'Brien &

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Gere has performed. (TPP 2005)

(6) *de maximis, inc.*

74. Third-Party Plaintiffs retained *de maximis, inc.* ("*de maximis*") to oversee the implementation of the remedial design and remedial action work pursuant to the OU-1 and OU-2 orders and to act as a liaison between Third-Party Plaintiffs and EPA. (Travers, Tr. 12/13/93 at 4, 44-45, 79.)

75. As of February 1995, Third-Party Plaintiffs have incurred and paid costs totalling \$229,347.87 for the various services rendered by *de maximis*, including oversight of the implementation of the remedial design and remedial action work pursuant to the OU-1 orders and the OU-2 order. (TPP 201-216; TPP 2000.)

II. THE PARTIES

A. ALLENTOWN PAINT MANUFACTURING, INC.

(1) *Ownership and Operations*

76. Third-Party Defendant Allentown Paint Manufacturing Co., Inc. ("*Allentown Paint*") is a corporation incorporated under the laws of the Commonwealth of Pennsylvania.

77. Allentown Paint operated a paint manufacturing plant located at Allen and Graham Streets in Allentown, Pennsylvania during the relevant time period.

(2) *Use of the Dorney Road Landfill*

78. SCA began hauling Allentown Paint's waste in 1978. (Wood, Dep. 1/19/93 at 80; TPP 468 at ¶ 38; Gilbert, Dep. 12/3/92 at 72-75.)

*12 79. SCA identified Allentown Paint as one of its commercial customers whose waste it hauled to the Site during the relevant time period. (TPP 880)

(3) *Waste Disposed at the Site*

(a) Content

80. Allentown Paint's waste included empty pigment bags, paint "skins", damaged paint cans

from which the paint had been poured out, and gelled paint. (Wood, Dep. 1/19/93 at 25-28.)

81. The empty bags contained residue from pigments. (Wood, Dep. 1/19/93 at 41.)

82. Paint waste was disposed in open 5-gallon containers. Paint disposed of as waste was dried; the solvents would have evaporated. (Wood, Dep. 1/19/93 at 26-27.) However, the constituent chemicals remained in the waste paint. (Wood, Dep. 1/19/93 at 27-28.)

83. The paint that Allentown Paint manufactured and disposed of at the Site contained hazardous substances, including lead chromate pigment, lead chromate, cadmium compounds, reactive polyamide xylene, copper phthalocyanine, lead compounds, lead salts, lead oxide, zinc salt, aluminum paste, zinc oxide, lead silicate, methyl ethyl ketoxime, pentachlorophenol, methyl ethyl ketone, and lead molybds. (TPP 470; TPP 471; TPP 472; TPP 473.)

84. Third-Party Plaintiffs' experts, Gary Brown ("*Brown*"), an engineer, and Dr. Michael Lowe ("*Lowe*"), a toxicologist, assigned a waste strength score of '17' to Allentown Paint's waste.FN10 (TPP 191)

(b) Volume

85. Of the waste that SCA hauled to the Site, 587.40 tons consisted of waste from SCA's various commercial routes. (See Findings of Fact Regarding SCA at § II.P., *infra*.)

86. Waste from Allentown Paint comprised 10.9% of the total waste that SCA hauled under its commercial accounts. (TPP 886; Dovell, Tr. 7/27/94 at 119-20.)

87. Accordingly, Allentown Paint arranged for the disposal of approximately 64.03 tons of waste at the Site.

B. AMANA REFRIGERATION, INC.

(1) *Ownership and Operations*

88. Third-Party Plaintiff Amana Refrigeration, Inc. ("*Amana*"), formerly known as Caloric Corporation ("*Caloric II*"), is a Delaware corporation.

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89. Amana owns a plant in Topton, Pennsylvania (the "Topton facility"), which manufactured kitchen ranges and other household appliances until December 1990. (TPD 1024 at ¶ 4.)

90. From the beginning of the relevant time period until December 31, 1971, the Topton facility was owned and operated by Caloric Corporation ("Caloric I"), a Pennsylvania corporation. (TPD 1024 at ¶ 40(a) - (c).) In December 1966, Caloric I became a wholly-owned subsidiary of Raytheon Company ("Raytheon"). On December 31, 1971, Caloric I merged with Raytheon and ceased to exist; thereafter, Raytheon operated the Topton facility for the remainder of the relevant time period. (TPP 1024 at ¶ 40(a) - (c).)

91. Caloric II was incorporated on December 13, 1982. Effective December 31, 1982, Caloric II acquired certain assets from Raytheon, including the Topton facility. (TPP 1024 at ¶ 40(a) - (c).)

*13 92. At all times relevant to this case, the Topton facility operated under the name "Caloric," first as Caloric I, then as the Caloric Corporation Division of the Raytheon Company, then as Caloric II. Thus, reference herein to "Caloric" applies generally to all of the above entities with regard to the operation of the Topton facility.

(2) Use of the Dorney Road Landfill

93. Caloric hauled its own waste to the Site in company-owned vehicles between May 1965 and July 1978. (Oswald, Tr. 9/21/94 at 14; Selig, Tr. 9/21/94 at 79; TPP 3; TPP 2; TPD 102 at ¶¶ 9, 14.)

94. The Mabry Log contains entries reflecting Caloric's use of the Site beginning in May 1965. Caloric appears as a regular customer in the Selig Log until July 1978. (TPP 3; TPP 2.) Additionally, landfill invoices issued to Caloric between December 1972 and July 1978 have been made part of the record. (TPP 535)

(3) Waste Disposed at the Site

95. The parties have stipulated that Caloric disposed of 5,138 tons of waste generated by the Topton facility at the Site between 1958 and 1978. *United States v. Atlas Minerals & Chemicals, Inc.*, C.A. No. 91-5118 (E.D. Pa. Aug. 15, 1994)

(stipulation).

(a) Plant Trash

96. During the relevant time period, Caloric's plant trash consisted primarily of corrugated paper, but included other refuse such as lunchroom waste and broken pallets. (TPD 1024 at ¶ 44; Andersen, Tr. 9/13/94 at 56.) Dried paint scrapings and oily rags occasionally were thrown in the plant trash as well. (Feldman, Tr. 9/13/94 at 99.)

97. Caloric disposed of plant trash in drums and barrels at the Topton facility. The drums and barrels were emptied into the trucks that went to the Site. (TPD 1024 at ¶ 44; Andersen, Tr. 9/13/94 at 54-55.)

98. Caloric disposed of 3,220.09 tons of plant trash at the Site during the relevant time period, based on the following:

(i) May 1965 - November 1972

99. From May 1965 through November 1972, Caloric hauled loose plant trash to the Site in two 5-ton open dump trucks. (TPD 1024 at ¶ 49(b); Selig, Tr. 9/21/94 at 79; Andersen, Tr. 9/13/94 at 18-19.)

100. From the Mabry Log and Selig Log entries, Third-Party Plaintiffs' accounting expert, Raymond Dovell ("Dovell"), calculated that Caloric disposed of approximately 18,595 loose cubic yards of waste at the Site prior to December 1972. (TPP 1021; Dovell, Tr. 7/27/94 at 131-32.)

101. Third-Party Plaintiffs' expert, W. Philip Wagner ("Wagner"), estimated that Caloric's uncompacted plant trash had a density of 100 lbs/cu.yd. (TPP 960; TPP 199(a), Attachment 2A.) Third-Party Defendants apparently do not dispute the density factors advanced by Third-Party Plaintiffs. (Hengemihle, Tr. 8/3/94 at 167.) In fact, Third-Party Defendants generally rely on these density factors throughout their proposed findings of fact. Accordingly, the court accepts Third-Party Plaintiffs' experts' density factors except as otherwise noted.

*14 102. Caloric disposed of 929.75 tons of plant trash at the Site during this time period. (18,595 cu.yd. x 100 lbs/cu.yd x 1 ton/2,000 lbs.)

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(ii) December 1972 - July 1978

103. Beginning in December 1972, Caloric hauled its plant trash in a 20 cubic yard compactor truck. (TPP 535; Andersen, Tr. 9/13/94 at 17-19.)

104. Landfill invoices show that Oswald charged Caloric for 761 "packer loads" between December 1972 and July 1978. (TPP 535) Thus, Caloric disposed of 15,220 compacted cubic yards of plant trash at the Site as reflected by the invoices. (20 cu.yd./load x 761 loads.)

105. Caloric's compacted plant trash had a density of 275 lbs/cu.yd. (Gordon, Tr. 2/8/94 at 24-25, 37-45.)

106. Between December 1972 and July 1978, Caloric disposed of 2,092.75 tons of plant trash at the Site as reflected by landfill invoices. (15,220 ccy FN11 x 275 lbs/ccy x 1 ton/2,000 lbs.)

107. No invoices are available for the months December 1977 through March 1978. (TPP 535) However, Caloric disposed of waste at the Site during those months. (TPP 2)

108. From December 1977 through March 1978, Caloric was charged \$1,437 for disposal at the Site. (TPP 2) Given the lack of invoices, however, no reliable evidence exists from which the court can determine exactly what Caloric disposed of at the Site during this time period. Thus, the court will attribute the landfill charges to Caloric's plant trash waste stream.

109. The Site charged Caloric \$1.00 per cubic yard of compacted plant trash. (TPP 535 at CAL00073.) Accordingly, Caloric disposed of 1,437 compacted cubic yards of plant trash at the Site during the four months for which no invoices are available.

110. Caloric disposed of 197.59 tons of waste at the Site during the four months for which no invoices are available. (1,437 ccy x 275 lbs/ccy x 1 ton/2,000 lbs.)

111. Brown and Lowe assigned Caloric's plant trash a waste strength score of '7', which the court accepts as accurate. (TPP 191)

(b) Construction Debris

112. Caloric disposed of debris from construction projects in open-top rolloff containers. (TPD 102 at ¶ 14; TPD 1024 at ¶ 49(b).)

113. Caloric admits that it disposed of insulation materials. (TPD 104 at ¶ 10.) The insulation presumably was included in the construction waste stream.

114. During the relevant time period, Caloric disposed of 152 rolloff containers full of debris at the Site. (TPD 104 at ¶ 25; TPP 535 at CAL00098-107.)

115. The landfill invoices reflect that Caloric was charged \$25 for each rolloff container, reflecting a charge of \$1.00 per cubic yard. (TPP 535)

116. The construction debris had a density of 800 lbs/cu.yd. (TPP 960; TPP 199(a), Attachment 2A.)

117. Caloric disposed of 1,520 tons of construction debris at the Site between February 1977 and November 1977. (total tons = (25 cu.yd./container x 152 containers) x (800 lbs/cu.yd.) x (1 ton/2,000 lbs.))

*15 118. Brown and Lowe assigned Caloric's construction debris a waste strength score of '7', which the court accepts as accurate. (TPP 191)

(c) Wood

119. The landfill invoices indicate that Caloric disposed of 535 loads of wood at the Site between January 1973 and November 1977. (TPP 535)

120. Caloric hauled the wood in 5-cubic yard dump trucks. (TPP 535 at CAL00042; TPD 1024 at ¶ 49(b); Andersen, Tr. 9/13/94 at 18-19.)

121. The wood that Caloric disposed of at the Site had a density of 250 lbs/cu.yd. (TPP 199(a), Attachment 2B.)

122. Caloric disposed of 334.38 tons of wood at the Site. (535 loads x 5 cu.yd./load) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.)

123. Brown and Lowe assigned this waste stream a waste strength score of '6', which the court accepts as accurate. (TPP 191)

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(d) Tires

124. Caloric disposed of one 5 cubic yard dump truck full of tires at the Site in May 1973. (TPP 535) The tires had a density of 250 lbs/cu.yd. (TPP 199(a), Attachment 2A; TPP 960.) Accordingly, the tires amounted to no more than one ton.

125. Brown and Lowe assigned a waste strength score of '6' to Caloric's tires. (TPP 191) The court accepts this score as accurate.

(e) "Scrap"

126. Caloric hauled 59 loads of "scrap" to the Site, as reflected by the landfill invoices, between December 1972 and July 1978. (TPP 535) This waste stream was comprised of discarded stove or range parts and other similar material. (TPD 104 at ¶ 9.)

127. Caloric hauled scrap to the Site in 5-cubic yard dump trucks. (TPP 535 at CAL00042; TPD 1024 at ¶ 49(b); Andersen, Tr. 9/13/94 at 18-19; Selig, Tr. 9/21/94 at 83.)

128. Caloric's scrap had a density of 250 lbs/cu.yd. (TPP 199(a), Attachment 2B.)

129. Caloric disposed of 36.88 tons of scrap at the Site. (59 loads x 5 cu.yd./load) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.)

130. Brown and Lowe assigned a waste strength score of '7' to Caloric's scrap. (TPP 191) The court accepts this score as reasonable.

(f) "It's barrel-mania here." (Selig, Tr. 9/21/94 at 173.)

131. The manufacturing process at the Topton facility included a porcelain enamel spray operation. (Andersen, Tr. 9/13/94 at 21.) The enamel that Caloric sprayed on its appliances was created from porcelain frit, a silica-based material. (Feldman, Tr. 9/13/94 at 77-78.)

132. When the spray booths in the porcelain enamel department were cleaned out, porcelain enamel overspray was shoveled from the booths and scraped from the walls. Caloric disposed of the overspray in drums that were hauled to the Site in dump trucks.

(Andersen, Tr. 9/13/94 at 21-23; TPD 104 at ¶ 18.)

133. The porcelain enamel overspray that Caloric hauled to the Site was a blue powdery material. (Andersen, Tr. 9/13/94 at 21; Selig, Tr. 9/21/94 at 79-80, 169.)

134. The porcelain enamel that Caloric used at the Topton facility during the relevant time period contained barium. (TPD 1038; Feldman, Tr. 9/13/94 at 87-88; TPD 104 at ¶ 11.)

*16 135. Caloric also had a synthetic paint department in which appliances were painted in spray booths with solvent-based paint. (Andersen, Tr. 9/13/94 at 25-26.)

136. The paint that Caloric used at the Topton facility included alkyd paint containing solvents such as methyl ethyl ketone ("MEK"), cellusolve acetate, Solvesso 100, and isopropanol. (TPD 104 at ¶ 16.) Additionally, Caloric used a black dip paint thinned with toluene. (TPD 104 at ¶ 17.)

137. Paint overspray and some paint residue was disposed of at the Site in drums. (Andersen, Tr. 9/13/94 at 26.)

138. Selig testified that Caloric disposed of drums containing dried paint that had a taffy-like consistency. (Selig, Tr. 9/21/94 at 81.)

139. Caloric hauled drums containing porcelain enamel overspray and paint waste to the Site in dump trucks. (Andersen, Tr. 9/13/94 at 44, 54.)

140. The landfill invoices reflect that Caloric disposed of 1,416 drums at the Site. (TPP 535)

141. The drums that Caloric hauled to the Site ranged from 20 to 55 gallons in size. (Andersen, Tr. 9/13/94 at 28.) This averages to 37.5 gallons per drum. The record does not reflect with any certainty whether the drums were completely full. Selig testified that "[u]sually they were filled." (Selig, Tr. 9/21/94 at 82.) However, some may have contained as little as three inches of paint. (Andersen, Tr. 9/13/94 at 26.) Accordingly, the court accepts Dovell's assumption that the drums contained an average of 30 gallons each.

142. The porcelain enamel overspray and paint

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waste had an average density of 250 lbs/cu.yd. (TPP 199(a), Attachment 2A.)

143. Based on the foregoing, the court finds that Caloric disposed of 26.29 tons of porcelain enamel overspray and paint waste at the Site. (1,416 drums x 30 gallons/drum) x (1 cu.ft./7.48 gallons) x (1 cu.yd./27 cu.ft.) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.)

144. Brown and Lowe assigned a waste strength score of '15' to Caloric's porcelain enamel overspray and paint waste. The score of '15' is based in part on Brown's and Lowe's judgment that this waste stream contained less than 0.5% solvents. Accordingly, the paint waste received the lowest possible score for solvent content. Based on the court's finding that the paint waste was not solid, as Brown and Lowe believed it to be, the score will be adjusted to reflect the court's finding that the paint waste contained more than 0.5% solvents. The score for content will be adjusted to a '2' instead of a '1'. The weighting factor for organic solvents will remain a '4'. Accordingly, the court finds that this waste stream should receive a waste strength score of '19'.

C. ATLAS MINERALS AND CHEMICALS, INC.
and EXIDE CORPORATION -- MERTZTOWN
FACILITY

(1) *Ownership and Operations*

145. Third-Party Plaintiff Exide Corporation ("Exide") is the successor entity to ESB Incorporated ("ESB"). For purposes of the third-party action in this case, Exide has stipulated that it is liable as the successor to ESB. (TPD 50 at ¶ 1.)

*17 146. From 1965 through December 31, 1977, ESB had a division called Atlas Minerals and Chemicals ("Atlas-ESB"). Atlas-ESB operated an asphalt manufacturing plant in Mertztown, Pennsylvania (the "Mertztown facility") from 1958 through 1977. (TPD 49 at ¶ 1.)

147. The Mertztown facility consists of approximately thirty buildings situated on fifty-one acres of mostly farmland. (Buchman, Tr. 9/23/94 at 27.)

148. In 1977, a number of ESB employees formed a

new corporation, Atlas Minerals and Chemicals, Inc. ("Atlas"). Atlas was incorporated on December 15, 1977. (TPD 51 at 1.) Pursuant to an agreement dated December 22, 1977, Atlas purchased certain assets and property from ESB, including the Mertztown facility. The transaction closed on December 30, 1977. (TPD 51 at ¶ 7.)

149. The parties have stipulated that Atlas and Exide are joint covered persons under 42 U.S.C. § 9607(a)(3). (TPD 49 at ¶ 3.)

150. Atlas commenced operations on January 1, 1978. Thereafter, Atlas owned and operated the Mertztown facility. (TPD 49 at ¶ 1.)

151. The Mertztown facility manufactured and sold synthetic resins and specialty asphalts from which corrosion-resistant mortars, tank linings, protective coatings, adhesives, and sealants were formulated. (TPD 51 at ¶ 4.)

(2) *Use of the Dorney Road Landfill*

152. The Site is located approximately one mile from the Mertztown facility. (TPD 51 at ¶ 28.)

153. Waste generated by the Mertztown facility was taken to the Site between 1958 and 1977. Until 1974, Atlas-ESB used a small company dump truck to transport waste to the Site on a daily basis. (Buchman, Tr. 9/23/94 at 64-65; TPD 51 at ¶ 3.)

154. The Selig Log shows that Atlas-ESB's use of the landfill decreased dramatically in 1975 and decreased even more in 1976. No entries in the log reflect any use of the landfill by Atlas-ESB after 1976. (TPP 2)

155. Atlas-ESB contracted with Clifford Hill ("Hill") and David Christman ("Christman") to transport waste from the Mertztown facility to the Site during the relevant time period. (Buchman, Tr. 9/23/94 at 58; Oswald, Tr. 9/21/94 at 7; Hill Dep., 3/5/93 at 166.)

(3) *Waste Disposed at the Site*

156. The parties have stipulated that the total amount of waste attributable to the Mertztown facility which was disposed of at the Site is 1,298 tons. (TPD 1091.)

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157. The waste generated by the Mertztown facility and disposed at the Site included general plant trash such as empty bags, empty pails, wooden pallets, lunchroom garbage, and office waste paper. The parties have stipulated that, in addition to plant trash, the Mertztown facility waste included sulfur scrubber sludge, empty bags which at one time had contained dry, fibrous asbestos, and rags which had been used to clean equipment with MEK. (TPD 49 at ¶ 2.)

(a) Asphalt Plant Waste

158. Since 1960, the Mertztown facility has included an asphalt processing plant (the "asphalt plant"), which produces asphalt primarily for roofing purposes. (Buchman, Tr. 9/23/94 at 36, 38, 52.) The process has not changed significantly since the relevant time period. (Buchman, Tr. 9/23/94 at 36.)

*18 159. The asphalt production process uses asphalt feedstock which is a petroleum fraction. (Sacks, Tr. 10/14/94 at 45-46.) The feedstock used during the relevant time period was obtained from oil refineries. (Buchman, Tr. 9/23/94 at 31, 48.) Atlas uses the same type of feedstock today. (Buchman, Tr. 9/23/94 at 49.)

160. In the asphalt production process, the feedstock is piped into a blowing tower. In the blowing tower, the feedstock is blown with steam and hot air to change its physical properties, thereby creating a roofing quality asphalt product. (Buchman, Tr. 9/23/94 at 32; Sacks, Tr. 10/14/94 at 39-40.)

161. The Mertztown facility does not use accelerants in its asphalt plant. (Buchman, Tr. 9/23/94 at 49.)

162. In addition to the asphalt product, the blowing process produces "asphalt condensate," which is a liquid composed of light hydrocarbons that are separated from the asphalt during the blowing process. (Buchman, Tr. 9/23/94 at 33; Sacks, Tr. 10/14/94 at 43.) The asphalt condensate goes through a wet scrubber and emerges from the blowing process mixed with water. (Buchman, Tr. 9/23/94 at 32-33.)

163. The Mertztown facility treated the asphalt condensate as a waste product until at least 1972. (Buchman, Tr. 9/23/94 at 46-47.) Initially, it was

placed in 55-gallon drums immediately after its emission from the blowing process. (Buchman, Tr. 9/23/94 at 33.)

164. In 1962, a lagoon was dug approximately 150 yards from the asphalt plant. Thereafter, the asphalt condensate was piped to the lagoon, which was twenty feet long, ten feet wide, and eight feet deep. The waste was pumped out of the lagoon periodically and placed in 55-gallon drums, which were taken away from the Mertztown facility for disposal. (Buchman, Tr. 9/23/94 at 33-36.)

165. The asphalt condensate was black in color and had the consistency of Number 6 fuel oil. (Buchman, Tr. 9/23/94 at 45-46.) However, it could be more viscous in cold temperatures. (Buchman, Tr. 9/23/94 at 60-61.) Also, it was thinner than Number 6 fuel oil when mixed with water. (Buchman, Tr. 9/23/94 at 45.)

166. The record does not support a finding that the asphalt condensate was contaminated by any hazardous substance not indigenous to petroleum.

167. Atlas and Exide admitted to disposing of 55-gallon drums of black liquid having the consistency of Number 6 fuel oil at the Dorney Road landfill. (TPD 51 at ¶¶ 10, 12, 38.)

168. During the relevant time period, the asphalt plant operated sporadically, averaging approximately twenty-four hours per week. (Buchman, Tr. 9/23/94 at 35.) The asphalt blowing process spawned one drum of asphalt condensate waste every eight to ten hours it operated. (Buchman, Tr. 9/23/94 at 35.)

169. In 1972, an incinerator was installed in the asphalt plant which was utilized to drive water vapor from the asphalt condensate. (Buchman, Tr. 9/23/94 at 31, 44; TPD 1092, Figure 3.) Shortly thereafter, the lagoon was closed and, subsequently, the Mertztown facility began to use the asphalt condensate as fuel to fire the steam generator in the asphalt plant. (Buchman, Tr. 9/23/94 at 45-46.)

*19 170. Between 1960 and 1972, the asphalt plant generated approximately 139 drums of asphalt condensate per year. (1 drum/9 hours x 24 hours/week x 52 weeks/year) Accordingly, the asphalt plant produced 1,668 drums of asphalt condensate

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which was disposed of as waste. (139 drums/year x 12 years)

171. During the time that Hill was hauling waste for Atlas, he never took drums to the Site. (Hill, Dep. 3/5/93 at 176.) However, Hill remembers seeing drums containing a black gooey material brought to the Site by the Atlas dump truck. (Hill, Dep. 3/5/93 at 170.)

172. During the time that Christman was hauling waste for Atlas, he picked up approximately one hundred 55-gallon drums containing "black pitch" material over a period of several months. (Christman, Dep. 9/21/92 at 42-43.) He disposed of these drums at a site other than the Dorney Road landfill. (Christman, Dep. 9/21/92 at 20-21.)

173. The court finds that all but 100 of the drums containing asphalt condensate from the Mertztown facility were disposed of at the Site.

174. Atlas' waste had a uniform density of 250 lbs/cu.yd. (TPP 199(a), Attachment 2A.)

175. The court finds that Atlas disposed of 53.38 tons of asphalt condensate at the Site. (1,568 drums x 55 gallons/drum) x (1 cu.ft./7.48 gallons) x (1 cu.yd./27 cu.ft.) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.)

(b) Sulfur Scrubber Sludge

176. A wet sulfur scrubber was installed at the Mertztown facility in 1960. The scrubber, which is about three feet in diameter and fifteen feet high, generated about three to five drums of sludge annually during the time period when Atlas-ESB was disposing of waste at the Site. (TPD 51 at ¶ 29; Buchman, Tr. 9/23/94 at 23, 36-37.)

177. Atlas-ESB disposed of approximately 64 drums of sulfur scrubber sludge at the Site. (4 drums/year x 16 years)

178. The sulfur scrubber sludge is a white, powdery material which has a pasty consistency when wet. (Buchman, Tr. 9/23/94 at 56.)

179. The parties have stipulated that there has been no change in the chemical composition of the sulfur scrubber sludge from the date it was first generated

through the present. (TPD 1093 at ¶ 1.) Additionally, the parties have stipulated that the sulfur scrubber sludge is a hazardous waste as defined by RCRA at 42 U.S.C. § 6901. (TPD 1093 at ¶ 2.)

180. The parties have stipulated that the sulfur scrubber sludge was disposed of at the Site. (TPD 49 at ¶ 2.)

181. Between 1960 and 1978, Atlas-ESB disposed of 2.18 tons of sulfur scrubber sludge at the Site. (64 drums x 55 gallons/drum) x (1 cu.ft./7.48 gallons) x (1 cu.yd./27 cu.ft.) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.)

(c) Plant Trash

(i) Overheated Asphalt

182. After the blowing process, product asphalt that is not shipped immediately is piped to heated storage tanks at the asphalt plant. (Sacks, Tr. 10/14/94 at 43-44.) Over time, some of the product asphalt (sometimes erroneously referred to as "petroleum coke") hardens on the inside walls of the tanks. (Sacks, Tr. 10/14/94 at 44-45; Buchman, Tr. 9/23/94 at 37-39.)

*20 183. Several years after the asphalt plant opened, workers at the plant realized that the hardened asphalt was interfering with the tanks' heating systems. (Buchman, Tr. 9/23/94 at 51.) Workers climbed inside the storage tanks and chipped the hardened asphalt from the sides of the tanks using hammers and chisels. (Buchman, Tr. 9/23/94 at 38-39.) This process is repeated whenever necessary, usually once every several years. (Buchman, Tr. 9/23/94 at 51.)

184. The overheated asphalt is black in color and resembles coal, although it is more porous than coal. (Buchman, Tr. 9/23/94 at 37-38.)

185. The parties have stipulated that the hardened asphalt was taken to the Site during the relevant time period. (TPD 1093 at ¶¶ 3 & 4.) Today, the hardened asphalt is placed in dumpsters along with general plant trash and disposed of at a landfill. (Buchman, Tr. 9/23/94 at 51-52.)

186. The hardened asphalt comprises a very small

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portion of the total waste generated by the Mertztown facility. (Buchman, Tr. 9/23/94 at 51.)

(ii) Asbestos Waste

187. Atlas and Exide have stipulated that they used asbestos in the manufacturing process at the Mertztown facility from the early 1950s until the mid-1980s. (TPD 1093 at ¶ 5.) The asbestos was a finely ground, powdery substance. (Buchman, Tr. 9/23/94 at 42.)

188. Atlas and Exide disposed of an unspecified number of empty bags which at one time had contained dry, fibrous asbestos. Atlas and Exide have stipulated that the bags were disposed of at the Site. (TPD 49 at ¶ 2; *see* Selig, Tr. 9/21/94 at 87.)

(iii) Dust Collector Waste

189. The Mertztown facility had several dust collectors, including two in the asphalt plant, one in the powder plant, and one in the sulfur plant. (Buchman, Tr. 9/23/94 at 40.)

190. The dust collectors in the asphalt plant collected slate flour. (Buchman, Tr. 9/23/94 at 40.) The dust collector in the powder plant collected silicas, powdered carbon, and sulfonic acid. (Buchman, Tr. 9/23/94 at 40-41.) The dust collector in the sulfur plant collected sand and powdered carbon. (Buchman, Tr. 9/23/94 at 40-41.)

191. An undetermined amount of dust collector waste was placed in dumpsters along with the general plant trash. (Buchman, Tr. 9/23/94 at 40-41.)

(4) Waste Strength Scoring

192. Third-Party Plaintiffs advocate classifying Atlas' waste into two waste streams, which they have labeled "Waste Stream A" and "Waste Stream B." The court accepts this classification and will adopt it for purposes of allocation.

193. Waste Stream A is comprised of all waste that Atlas hauled to the Site with its own trucks, and includes plant trash, office trash, empty pails, pallets with hardened asphalt, overheated asphalt, empty bags that had contained asbestos, rags soaked with MEK, sulphur scrubber sludge, and asphalt

condensate.

a. Waste Stream A constituted 1,233 tons of the total 1,298 tons of waste that Atlas disposed of at the Site. (TPP 1188)

*21 b. Brown and Lowe assigned a waste strength score of '12' to Waste Stream A. In reaching this score, Brown and Lowe assumed that PNAs were contained in Waste Stream A and, accordingly, assigned a weighting factor of '5' to organic solvents for high toxicity/mobility. (TPP 191)

c. Third-Party Plaintiffs agree that Waste Stream A should receive the elevated score of '12' even if the court finds that asphalt condensate is not a hazardous substance under CERCLA as a matter of law.

d. The court finds that asphalt condensate is not a hazardous substance as defined by CERCLA. *See infra*, DISCUSSION, § II.C. Therefore, instead of assessing each waste stream separately, the court accepts Third-Party Plaintiffs' proposed findings regarding the uniform waste strength score to be assigned to Waste Stream A.

194. Waste Stream B is comprised of 65 tons of plant trash that was hauled by Christman and Hill. (TPP 1188) Brown and Lowe assigned a waste strength score of '7' to this waste stream. The court finds this score to be appropriate.

D. DAILY TRASH COLLECTION

(1) Ownership and Operations

195. Third-Party Defendant Daily Trash Collection ("Daily Trash") is a Pennsylvania partnership.

196. Charles Yoachim is an individual who resides at 3815 and 3817 Dillingersville Road in Zionsville, Pennsylvania. At all times relevant to this action, Charles Yoachim was a partner of Daily Trash Collection and was acting in furtherance of partnership business.

197. Ray Yoachim ("Yoachim") is an individual who resides at 3815 and 3817 Dillingersville Road in Zionsville, Pennsylvania. At all times relevant to this action, Yoachim was a partner of Daily Trash Collection and was acting in furtherance of

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partnership business.

198. Daily Trash operated as a trash hauling business from approximately 1966 through July 1991. (Yoachim, Tr. 12/9/93 at 74.) The company was sometimes referred to as "Yoachim Brothers." (Yoachim, Tr. 12/9/93 at 75.)

(2) Use of the Dorney Road Landfill

199. Daily Trash used the Site from September 1969 through December 1978. (TPP 2; Yoachim, Tr. 12/9/93 at 76.)

200. Daily Trash transported waste in 20 cubic yard compactor trucks. (Yoachim, Tr. 12/9/93 at 77-78.)

201. Daily Trash hauled waste from commercial customers including Sacred Heart Hospital, Allentown Hospital, A-Treat Bottling Company, Inc., and Allentown Auto Parts, a/k/a Circle S Auto Parts, a/k/a J.D. Snyder and Company. (Yoachim, Tr. 12/9/93 at 78, 92, 98-100.) Daily Trash also hauled waste from some residences in Allentown, Emmaus, Vera Cruz, Zionsville, Schoenersville, Macungie, Trexlertown, South Whitehall Township, and Salisbury Township. (Yoachim, Tr. 12/9/93 at 115-16.)

202. The Site charged 50CENTS per compacted cubic yard prior to 1970. From 1970 through 1971, the Site charged 75CENTS per compacted cubic yard. In 1972, the price rose to \$1.00 per compacted cubic yard for the remainder of the relevant time period. (TPD 1536 at 4.)

*22 203. The Selig Log reflects charges to Daily Trash as follows:

| | | |
|-------------|----------|-----------|
| 9/69-12/69 | \$ 646 | |
| | @ | |
| 50CENTS/ccy | = | |
| | | 1,292 ccy |
| 1/70-12/71 | \$ 3,969 | |
| | @ | |
| 75CENTS/ccy | = | |
| | | 5,292 ccy |
| 1/72-12/78 | \$19,713 | |
| | @ | |

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\$1 /ccy

=

19,713 ccy

TOTAL:

26,297 ccy

(TPP 2)

204. Daily Trash hauled primarily MSW-type waste such as residential waste, paper and kitchen waste from the hospitals, broken bottles from A-Treat, and paper and cardboard waste from Allentown Auto Parts. (Yoachim, Tr. 12/9/93 at 79-120.)

205. Commingled MSW has a density of 660 lbs/cu.yd. when compacted in a truck. (TPP 960)

206. Accordingly, Daily Trash hauled 8,678.01 tons of waste to the Site between September 1969 and December 1978. (26,297 ccy x 660 lbs/ccy x 1 ton/2,000 lbs.)

207. A significant portion of the waste that Daily Trash hauled to the Site was generated by other Third-Party Defendants. Dovell calculated these volumes as follows:

| | | |
|----------------------------|-------|------------|
| A-Treat Bottling Co., Inc. | | 6,026 lcy |
| | 12 | |
| J.D. Snyder | | 5,824 lcy |
| Keh's Garage | | 728 lcy |
| Persing Auto Body | | 3,640 lcy |
| Sacred Heart Hospital | | 19,020 lcy |
| | and | |
| 9,360 ccy | TOTAL | 35,238 lcy |
| | + | |
| 9,360 ccy | | |

Daily Trash also hauled 18 tons of coal ashes from Sacred Heart. Third-Party Defendants do not dispute Dovell's estimates. The customers disposed of the waste in loose boxes. However, Sacred Heart also had a compactor box. The loose trash had a density of 250 lbs/cu.yd. and the trash picked up from Sacred Heart's compactor had a density of 500 lbs/ccy. (TPP 960; TPP 199(a), Attachment 2A.)

Accordingly, the waste that Daily Trash hauled for Third-Party Defendant generators comes to approximately 6,762.75 tons. (18 tons) + (35,238 lcy x 250 lbs/lcy x 1 ton/2,000 lbs) + (9,360 ccy x 500 lbs/ccy x 1 ton/2,000 lbs.) Therefore, for allocation purposes, 1,915.26 tons of MSW-type waste will be attributed to Daily Trash. (8,678.01 total - 6,762.75 TPD generators.)

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208. Brown and Lowe assigned a waste strength score of '7' to MSW, based on the presence of a wide variety of hazardous substances. (TPP 191) The court finds that this is an appropriate score for the waste hauled to the Site by Daily Trash.

E. EAST PENN MANUFACTURING COMPANY, INC.

(1) *Ownership and Operations*

209. Third-Party Plaintiff East Penn Manufacturing Company, Inc. ("East Penn") is a corporation incorporated under the laws of the Commonwealth of Pennsylvania.

210. East Penn currently manufactures automotive and industrial batteries. East Penn operates a facility located in Lyon Station, Berks County, Pennsylvania (the "Lyon Station facility"). (TPD 118 at ¶ 4; Wojton, Tr. 8/2/94 at 8.)

211. The Lyon Station facility is a 225 acre, multiple building facility with the following operations: three automotive battery plants; one industrial battery plant; a secondary lead smelter which is used in connection with the battery operations; a wire mill which produces jumper cables; and a cable manufacturing plant which assembles jumper cables and ancillary automotive products. (TPD 118 at ¶ 4.)

*23 212. East Penn manufactured brand name batteries including Deka and Lynx. The majority of batteries manufactured during the relevant time period, however, were private brand batteries which were built to customer specifications. (Wojton, Tr. 8/2/94 at 37-38.)

213. As part of its operations, East Penn acquires spent batteries and recovers the lead from them. East Penn then uses the lead to manufacture new batteries. (Wojton, Tr. 8/2/94 at 9.)

214. Spent batteries typically contain lead plates, sulfuric acid, and paper or plastic separators which keep positive plates and negative plates apart to keep the battery from shorting out. Over time, some sludge accumulates in the bottom of the battery. The sludge consists of particles from the separators and some lead. (Wojton, Tr. 8/2/94 at 14-15; Robertson, Tr. 10/4/94 at 115.)

215. The on-site smelter at the Lyon Station facility includes a breaking operation in which the spent batteries are broken apart prior to recycling. Sulfuric acid is drained out of the batteries and eventually processed through a waste water treatment plant. Casings are disposed of as waste. Lead is processed through the smelter and used in the manufacture of new batteries. The tops of the batteries are either disposed of with the casings or, if they have lead posts, processed with the lead. (Wojton, Tr. 8/2/94 at 9-12; Lebo, Dep. 3/29/93 at 11; Snyder, Dep. 3/29/93 at 17-18.)

(2) *Use of the Dorney Road Landfill*

216. Prior to 1976, East Penn disposed of spent battery casings by landfilling at the Lyon Station facility. (Wojton, Tr. 8/2/94 at 14.)

217. East Penn began using the Dorney Road landfill in June 1976 and continued disposing of waste there until the Site closed in December 1978. (TPD 114)

(3) *Waste Disposed at the Site*

218. East Penn disposed of battery casings and plant trash at the Site. East Penn did not dispose of any complete batteries at the Site; any off-spec batteries were recycled in the same manner as the spent batteries. (Wojton, Tr. 8/2/94 at 55-56.)

(a) *Battery Casings*

219. The parties have stipulated that East Penn disposed of 13,260 loose cubic yards of broken battery casings at the Site. (TPD 120.)

220. The battery casings that East Penn disposed of at the Site had a density of 500 lbs/cu.yd. (TPP 199(a), Attachment 2A.)

221. East Penn disposed of 3,315 tons of battery casings at the Site. (13,260 cu.yd. x 500 lbs/cu.yd. x 1 ton/2,000 lbs.)

222. The casings and covers were not washed before they were sent to the Site. (Wojton, Tr. 8/2/94 at 15-16, 26-27; Leupold, Dep. 3/29/93 at 15-16; Snyder, Dep. 3/29/93 at 18.) However, they were stored outside for some amount of time and exposed to rain, which may have had some cleansing effect.

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(Wojton, Tr. 8/2/94 at 12; Snyder, Dep. 3/29/93 at 46.)

223. In 1973, DER inspected the Lyon Station facility and prepared a report on East Penn's land disposal practices at the facility. The report stated that East Penn was disposing of 0.0005 tons (one pound) of lead on the premises per year. (TPD 955 at 000065.) The total volume of casings generated by East Penn has nearly doubled since 1973. (Wojton, Tr. 8/2/94 at 68.) Even taking this into consideration, DER's estimation of the lead content would amount, on average, to only 0.0078% of the total weight of the casings. The court disregards this estimate as excessively low. East Penn also considers it too low. (TPP FOF at ¶ 401; Wojton, Tr. 8/2/94 at 66-68, 70.)

*24 224. Battery casings normally can be expected to contain residual elements associated with lead batteries, such as lead and acid. (Wagner, Tr. 2/9/94 at 65.)

225. Third-Party Defendants' expert, John B. Robertson ("Robertson"), testified that crushed battery casings typically contain anywhere from 1% to 18% lead. (Robertson, Tr. 10/5/94 at 53.)

226. Third-Party Plaintiffs' experts, Gary Brown ("Brown") and Dr. Michael Lowe ("Lowe"), estimated that the concentration of lead in the East Penn battery casings was less than 0.5%. (Brown, Tr. 7/14/94 at 10-11; Lowe, Tr. 7/20/94 at 81.)

227. The evidence concerning the concentration of lead found in East Penn's battery casings is less than consistent. However, the court estimates that East Penn's battery casings contained at least 0.5% lead, but probably not more than 1%.

228. Brown and Lowe assigned a waste strength score of '11' to East Penn's battery casings. (TPP 191) This score was based in part on Brown's and Lowe's estimation that the battery casings contained less than 0.5% lead. This resulted in a score of '6' for inorganics. Adjusting this to reflect the court's finding that the battery casings contained more than 0.5% lead, the inorganic score increases to '12', and the total score is '17'.

(b) Plant Trash

229. Between September 1976 and December 1978, East Penn arranged for David Christman ("Christman") to haul plant trash from the Lyon Station facility to the Site. (TPD 117 at ¶ 7; TPD 115.)

230. The parties have stipulated that East Penn arranged for the disposal of 14,198 loose cubic yards of plant trash at the Site. (TPD 120.)

231. East Penn's plant trash consisted primarily of lunchroom waste and office waste. (Wojton, Tr. 8/2/94 at 29.)

232. East Penn's plant trash had a density of 250 lbs/cu.yd. (TPP 199(a), Attachment 2A.)

233. The court finds that East Penn arranged for the disposal of 1,774.75 tons of plant trash at the Site. (14,198 cu.yd. x 250 lbs/cu.yd. x 1 ton/2,000 lbs.)

234. Brown and Lowe assigned a waste strength score of '6' to East Penn's plant trash. The court finds this score to be appropriate.

F. EXIDE CORPORATION -- ALLENTOWN PLANT

(1) *Ownership and Operations*

235. Exide changed its name to ESB Incorporated ("ESB") in 1967. Following a number of reorganizations, ESB changed its name back to Exide Corporation in 1981. (TPD 130 at 7-8.) The parties have stipulated that Exide is liable as the successor to ESB. (TPD 50 at ¶ 1.)

236. Exide owned and operated a lead acid battery manufacturing plant at 2001 Lehigh Street in Allentown, Pennsylvania from 1952 through 1989 (the "ESB Allentown Plant"). (TPD 129 at ¶¶ 1-2; TPD 130 at ¶ 7; Deily, Dep. 3/18/93 at 8.)

237. From about 1963, the ESB Allentown plant operated under the name of Willard Battery Company ("Willard"). (Deily, Dep. 3/18/93 at 11-12.) In 1988, Exide merged with Willard; Exide was the surviving corporation. (TPD 1161) The Articles of Merger provided that Exide would "succeed to and have all the assets, rights, privileges, immunities, powers, franchises, patents, trademarks, licenses, registrations and all property,

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real, personal and mixed, subject to all the debts, restrictions, disabilities, duties and other liabilities of Willard." (TPP 1161, Article Twelfth.)

*25 238. Reference herein to "Exide" applies generally to all of the above entities with regard to the operations of the ESB Allentown plant.

239. At the ESB Allentown plant, Exide manufactured starting, lighting and ignition ("SLI") batteries for automobiles, trucks, and farm equipment, as well as a variety of specialty batteries. (TPD 130 at 2.)

(2) Use of the Dorney Road Landfill

240. Hoch Sanitation ("Hoch") hauled waste from the ESB Allentown plant from 1974 through 1976. (TPD 130 at 4; Bergsman, Dep. 12/3/91 at 60-61.)

241. Hoch disposed of waste from commercial accounts at the Site and at the Heleva landfill. Waste from each commercial customer was hauled to both sites. (Bergsman, Dep. 12/3/91 at 19-20.)

242. Arthur Smith Sanitation ("Smith") hauled waste from the ESB Allentown plant from 1976 until about 1981. (TPP 130 at 4.) However, the record does not support a finding that Smith took Exide's waste to the Site.

(3) Waste Disposed at the Site

(a) Volume

243. Hoch maintained two rolloff containers at the ESB Allentown plant. One container was a 30 or 40 cubic yard compactor. The other was a 20 or 30 cubic yard open container. (Beaky, Dep. 3/19/93 at 37-38.)

244. Hoch hauled Exide's waste only when Exide requested a pick-up. Generally, Hoch would pick up the compactor about once each week. The open box was hauled much less frequently, about once a month. (Beaky, Dep. 3/19/93 at 38-39.)

245. Third-Party Plaintiffs' experts assigned a general density factor of 500 lbs/cu.yd. to trash compacted on-site, and 250 lbs/cu.yd. to loose trash. (TPP 960)

246. Assuming that Hoch hauled half of Exide's waste from the ESB Allentown plant to the Site, the court estimates the total amount of waste that Exide disposed of at the Site to be 492.5 tons, based on the following calculations:

a. compactor: $((35 \text{ cu.yd./week} \times 104 \text{ weeks} = 3,640 \text{ cu.yd.}) \times (500 \text{ lbs/cu.yd.}) \times (1 \text{ ton}/2,000 \text{ lbs})) = 910 \text{ tons}$

b. open box: $((25 \text{ cu.yd./month} \times 24 \text{ months} = 600 \text{ cu.yd.}) \times (250 \text{ lbs/cu.yd.}) \times (1 \text{ ton}/2,000 \text{ lbs.})) = 75 \text{ tons}$

c. $(910 + 75)/2 = 492.5$

(b) Content

247. The rolloff containers that Hoch hauled from the ESB Allentown plant were used for disposal of office waste, lunchroom waste, washroom waste, cardboard boxes, plastic wrap, and other similar plant trash. (TPD 129; Deily, Dep. 3/18/93 at 110-11.)

248. Pursuant to Exide's company policy, all recyclable waste materials at the ESB Allentown plant were recycled. (Deily, Dep. 3/18/93 at 98-101.)

249. All battery components and materials that came in contact with lead, including floor sweepings, were recycled or were sent to a smelter for reclamation. (Deily, Dep. 3/18/93 at 98-102.) No credible evidence shows that these types of materials were ever included in the trash that Hoch hauled from the ESB Allentown plant. (Bergsman, Dep. 12/3/91 at 61.)

250. Exide urges the court to find, in light of the above, that no hazardous substances were present in the trash that ESB Allentown Plant disposed of at the Site. However, Third-Party Plaintiffs' own experts testified that hazardous substances are present in virtually all trash. The fact that Exide's trash included lunchroom waste and office waste leads inexorably to the conclusion that Exide's trash must have included some potato chips and ballpoint pens. (Gordon, Tr. 12/17/93 at 173 ("there were at least three listed hazardous substances in the potato chips that I had with my sandwich for lunch today"); Wagner, Tr. 2/9/94 at 43-47 ("ballpoint

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pens commonly contain solvents and colorants, pigments").)

*26 251. Brown and Lowe assigned no waste strength score to Exide's trash. However, the court finds the minimum score of '6' to be appropriate.

G. GAF CORPORATION

(1) *Ownership and Operations*

252. Third-Party Plaintiff GAF Corporation ("GAF") is a corporation incorporated under the laws of the State of New Jersey.

253. GAF owned and operated a facility at 1139 Lehigh Avenue in Whitehall, Pennsylvania, also known as the Fullerton area (the "Fullerton facility"), at which it manufactured vinyl floor covering and, beginning in 1972, latex felt. (TPD 179 at ¶ 1.) GAF acquired the Fullerton facility in 1967 and sold it in 1981. (TPD 179 at ¶ 1.)

254. The parties have stipulated that GAF is a covered person under 42 U.S.C. § 9607(a)(3), and that it arranged for the disposal of asbestos at the Dorney Road landfill. (TPD 192 at ¶¶ 1 & 2.)

255. The parties have stipulated that GAF's felt mill at the Fullerton facility became fully operational by February 1, 1972. (TPD 2161 at ¶ 4.)

(2) *Use of the Dorney Road Landfill*

(a) *Reeser Contracts*

256. GAF entered into two service contracts with Reeser's Hauling Service for waste disposal between 1971 and 1976 (the "Reeser Contracts").

257. The first Reeser Contract was dated May 11, 1971 and expired on May 31, 1974. (TPD 156) The contract specified that Reeser was to take GAF's waste to the Dorney Road Landfill if GAF's own site was unavailable for waste disposal. (TPD 156) Reeser began hauling GAF's waste under this contract on or about June 1, 1971. (Buhner, Tr. 10/13/94 at 24-25.)

258. The second Reeser Contract was dated June 1, 1974 and remained in effect until May 31, 1976. (TPD 157) The contract specified that if GAF's site

became unavailable, Reeser was to use one of the following sites: Heleva Landfill, Oswald's Landfill (Dorney Road), Chrin Landfill, Novak Landfill, or Reeser's Landfill. (TPD 157)

(b) *GAF Sites*

259. On June 5, 1968, GAF contracted with Northern Lehigh Land Reclamation ("Northern") to purchase a 5.488 acre site in Northampton County, Pennsylvania for use as a waste disposal site (the "Danielsville Site"). (TPD 1076.) The Danielsville Site had two quarry pits. (Buhner, Tr. 10/13/94 at 35; Lower, Dep. 9/27/94 at 18.) GAF's waste was disposed in only one of the pits; the second pit never has been used for waste disposal. (Lower, Dep. 9/27/94 at 20-21.)

260. Also on June 5, 1968, GAF contracted with Northern to dispose of waste from the Fullerton facility at a site in Northampton County, Pennsylvania known as the "Oplinger Quarry." (TPD 1072.) The Oplinger Quarry is located two miles from the Danielsville Site by road, one mile as the crow flies. (Lower, Dep. 9/27/94 at 29.) Northern rented this site from the owner, Delbert Oplinger, and made it available to GAF for waste disposal pursuant to the 1968 contract. (Lower, Dep. 9/27/94 at 27-28.) GAF's waste was disposed of in one of two quarry pits at the Oplinger Quarry. (Lower, Dep. 9/27/94 at 30.)

*27 261. Cunard Lower ("Lower") is the sole shareholder of Northern, which is a corporation engaged in the business of buying and selling real estate, primarily for waste disposal. (Lower, Dep. 9/27/94 at 10.)

262. When GAF brought waste to the Danielsville Site and the Oplinger Quarry, Lower pushed the waste into the pits with a bulldozer. He did this at the Oplinger Quarry about once or twice a week and at the Danielsville Site every other day. (Lower, Dep. 9/27/94 at 35-36.)

263. No waste other than GAF's was disposed of at either the Danielsville Site or the Oplinger Quarry. (Lower, Dep. 9/27/94 at 64.)

264. In January 1970, a fire started in the pit at the Danielsville Site. (Lower, Dep. 9/27/94 at 24-25.) The fire smoldered for about a year, during which

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no waste could be disposed there. (Lower, Dep. 9/27/94 at 23.)

265. Lower testified that he backfilled the pit at the Danielsville Site and no more waste was disposed there after the fire. (Lower, Dep. 9/27/94 at 36, 78.) The court notes that other evidence suggests that GAF did dispose of some additional waste at the Danielsville Site as late as May 1972. (Buhner, Tr. 10/13/94 at 28-30; *see* TPP 1110; *see also* Lower, Dep. 9/27/94 at 48-58.) However, this discrepancy is immaterial.

266. GAF disposed of waste at the Oplinger Quarry for almost two years before a fire started in the pit there. (Lower, Dep. 9/27/94 at 31.) There were three separate fires at the Oplinger Quarry, during which no waste could be disposed there. (*Id.*) The first two fires were short-lived compared to the third fire, which lasted several weeks. (Lower, Dep. 9/27/94 at 32.) It is not clear from the record exactly when each fire occurred.

267. In April 1971, GAF and Northern renegotiated their contract for disposal at the Oplinger Quarry. (TPP 620(c)) The Danielsville Site was not being used for waste disposal at the time. (Buhner, Tr. 10/13/94 at 27-28.) GAF continued to dispose of waste at the Oplinger Quarry until the first half of 1973. (Lower, Dep. 9/27/94 at 35, 40, 46, 99.)

268. Reeser testified that he "used the Danielsville site as long as it was open. It was only after that site was closed that we had to look elsewhere for sites." (Reeser, Dep. 12/5/91 at 43.) The court notes that Reeser spoke only of the "Danielsville" site. Based on the other evidence regarding GAF's two sites, and given their close proximity to each other, it is reasonable to infer that Reeser could have been speaking of either site.

269. Based on the foregoing, the court finds that GAF's waste was disposed of primarily, if not exclusively, at the Danielsville Site and/or the Oplinger Quarry until mid-1973.

(c) The Dorney Road Landfill

270. The Selig Log shows no significant entries for Reeser between January 1972 and April 1973. (TPP 2) The absence of an entry in the log for a hauler during any given month means that the hauler did

not use the Site that month. (Selig, Tr. 9/21/94 at 137.) Accordingly, the court finds that Reeser did not use the Site between January 1972 and April 1973.

*28 271. The court finds that Reeser hauled GAF's waste to the Site between May 1, 1973 and May 31, 1976, based on the following:

a. Reeser was hauling GAF's waste from 1971 until May 31, 1976, which is when the second Reeser contract expired. (TPD 156; TPD 157.)

b. Both of the Reeser Contracts designate the Site as one to be used to dispose of GAF's waste. (TPD 156; TPD 157.)

c. The Selig Log shows that Reeser consistently used the Site from May 1973 through May 1976. (TPP 2)

d. Selig testified that Reeser brought waste to the Site beginning some time during the early 1970s and continued to do so until about 1976. (Selig, Tr. 9/21/94 at 84, 86.)

e. Selig's testimony is consistent with this court's finding that the Oplinger Quarry closed in mid-1973.

f. Documents prepared during this time period reveal that compacted waste was disposed of at the Site in addition to the linoleum that Selig recalled seeing. (TPD 160; TPD 165.)

272. The court finds that Reeser disposed of GAF's waste at the Dorney Road landfill five days per week between May 1, 1973 and May 31, 1974, based on the following:

a. The first Reeser Contract, which designated the Dorney Road landfill as the only alternative to GAF's sites, was in effect until May 31, 1974. (TPD 156)

b. Selig testified that Reeser brought rolls of linoleum from GAF. (Selig, Tr. 9/21/94 at 83-84.) He "couldn't say if [Reeser] did or did not" bring any other waste from GAF, but stated that it was possible. (Selig, Tr. 9/21/94 at 84, 86.)

c. Selig testified that when Reeser began hauling

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GAF's waste to the Site, he brought one full load of linoleum per day. (Selig, Tr. 9/21/94 at 136.) He acknowledged that 35 cubic yards of linoleum per day, for a year and a half, would be a "good estimate" of the volume disposed. (Selig, Tr. 9/21/94 at 139, 191.)

273. The court finds that between June 1, 1974 and May 31, 1976, Reeser disposed of GAF's waste at the Site, on average, approximately once a week, based on the following:

a. From June 1, 1974 until May 31, 1976, the second Reeser contract was in effect. This contract listed the Dorney Road landfill as one of five sites which Reeser was to use in the event GAF's own site was unavailable. (TPD 157)

b. Selig testified that, at some point in time, he and Oswald asked Reeser to pay an increased rate to dispose of GAF's waste because they thought that it was taking up too much space at the Site. Thereafter, Reeser brought GAF's waste to the Site only sporadically. (Selig, Tr. 9/21/94 at 130.)

c. Two of Reeser's drivers who picked up waste at GAF on a regular basis testified that they hauled GAF's waste primarily to a site other than the Dorney Road landfill. (DeLong, Dep. 3/31/93 at 141; Ryder, Dep. 4/8/92 at 100, 153.)

(3) Waste Disposed at the Site

(a) Content

274. During the relevant time period, the Fullerton facility generated various waste streams including off-spec rolls of vinyl flooring, scraps of vinyl flooring, office waste, pallets, cardboard, corrugated cartons, empty bags, and fiber drums. (TPD 179 at ¶ 9; TPD 158 at ¶ 2c.)

*29 275. Beginning in February 1972, with the addition of the felt mill, GAF's waste also included off-spec rolls, trimmings, and scraps of latex felt from the felt mill, small amounts of wetted and bagged asbestos sweepings, and latex-asbestos clarifier sludge from the felt mill wastewater clarifier. (TPD 179 at ¶ 9; TPD 158 at ¶ 2c.)

276. The clarifier sludge routinely was referred to as "felt paper." It was discharged from the felt mill as

a liquid, but dried once it was outside for a period of time. When dry, the sludge was a "paperish substance." (Ryder, Dep. 4/8/92 at 62.)

277. The asbestos in the clarifier sludge and trimmings was fully encapsulated and non-friable. (TPD 158 at ¶ 2c.)

278. GAF disposed of rolls and sheets of linoleum which were eight to ten feet long and eight inches to two feet in diameter. (Selig, Tr. 9/21/94 at 83-84.)

279. There is no dispute that GAF disposed of waste containing hazardous substances at the Dorney Road Landfill. Third-Party Plaintiffs' experts identified these hazardous substances as asbestos, nickel, chromium, zinc, methyl ethyl ketone, toluene, lead, and cadmium. (TPD 1533(c); TPD 192.)

280. It is also undisputed that the GAF waste disposed of at the Dorney Road Landfill is not "hazardous waste" as that term is defined under RCRA. (Robertson, Tr. 9/30/94 at 70; Malinowski, Tr. 7/13/94 at 115-116.)

281. Brown and Lowe assigned GAF's waste a uniform waste strength score of '7'. (TPP 191) The court finds this score to be appropriate.

(b) Volume

282. GAF had two compactors and several open boxes for waste disposal throughout the Fullerton facility. There was a 40 cubic yard on-site compactor outside the inspection department and a 40 cubic yard on-site compactor at the felt mill. The felt mill had a 20 or 30 cubic yard open container for clarifier sludge. The rolls of linoleum were disposed of in a 30 cubic yard open container. (Reeser, Dep. 12/5/91 at 35; Nero, Dep. 4/13/93 at 33; Tierno, Dep. 3/26/93 at 180-81; Yanolko, Dep. 3/8/93 at 153-55.)

283. The compactors handled plant trash such as paper, cardboard, and lunchroom waste. (Reeser, Dep. 12/5/91 at 36.)

284. Reeser emptied the 40 cubic yard container from the inspection department every day. He hauled the 40 cubic yard container from the felt mill about two or three days per week. (Reeser, Dep. 12/5/91 at 35.) The compactors were full when they

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were hauled away. (Ryder, Dep. 4/8/92 at 64.)

285. The 30 cubic yard box containing linoleum rolls was hauled at least once every day. The clarifier sludge was hauled about once a week. (Ryder, Dep. 4/8/92 at 65; Nero, Dep. 4/13/93 at 34-35.) Normally, the container in which the sludge was disposed was not full. (Ryder, Dep. 4/8/92 at 107.)

286. GAF disposed of 9,960 loose cubic yards of linoleum, 840 loose cubic yards of clarifier sludge, and 13,280 compacted cubic yards of plant trash at the Site:

May 1, 1973-May 31, 1974 (56 weeks)

linoleum 30 cu.yd./day x 5 days/week x 56 weeks = 8,400 cu.yd.. plant trash 40 ccy/day x 5 days/week x 56 weeks = 11,200 ccy. clarifier sludge 15 cu.yd./week x 56 weeks = 840 cu.yd. June 1, 1974-May 31, 1976 (52 weeks). linoleum 30 cu.yd./week x 52 weeks = 1,560 cu.yd.. plant trash 40 ccy/week x 52 weeks = 2,080 ccy

*30 287. Wagner assigned a uniform density of 250 lbs/cu.yd. to GAF's waste. (TPP 199(a), Attachment 2A.) The court accepts this factor insofar as it applies to the linoleum and clarifier sludge. The court finds, however, that Wagner's factor fails to account for GAF's plant trash, which was compacted at the Fullerton facility and hauled to the Site in 40 cubic yard rolloff containers. Therefore, the court will borrow the 350 lbs/ccy factor which Wagner assigned to GE's plant trash and apply this density factor to GAF's plant trash. (See TPP 199(a), Attachment 2A.)

288. Based on the foregoing, the court finds that GAF disposed of a total of 3,674 tons of waste at the Site: 1,350 tons of linoleum and clarifier sludge (9,960 cu.yd. linoleum + 840 cu.yd. sludge) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.) and 2,324 tons of plant trash at the Site (13,280 ccy plant trash) x (350 lbs/ccy) x (1 ton/2,000 lbs.)

H. GARDEN STATE TANNING, INC.

(1) Ownership and Operations

289. Third-Party Plaintiff Garden State Tanning, Inc. ("Garden State") is a corporation incorporated under the laws of the State of Delaware.

290. The parties have stipulated that Garden State is a "covered person" within the meaning of 42 U.S.C. § 9607(a). *United States v. Atlas Minerals and Chemicals, Inc.*, C.A. No. 91-5118 (E.D. Pa. Oct. 27, 1993) (stipulation).

291. During the relevant time period, Garden State operated a plant at Locust and Franklin Streets in Fleetwood, Pennsylvania (the "Fleetwood plant"), at which it conducted a leather finishing operation. (Ehret, Tr. 9/15/94 at 36; see TPD 193B, Attachment IV.)

292. One of the processes at the Fleetwood plant was the buffing, or sanding, of tanned hides. During the buffing process, leather is mechanically sanded to remove surface imperfections and to improve the nap on the flesh side. (TPD 214 at 104.)

293. After buffing, the hides received a water-based base coat, or prime coat. (Ehret, Tr. 9/15/94 at 63.) The base coat was generally applied by hand, using a soft cloth. The used rags were disposed of in drums along with other liquid waste. (Engleman, Tr. 9/15/94 at 177.) Unusable base coat was also disposed of in drums. (Engleman, Tr. 9/15/94 at 177.)

294. As part of the finishing operation, tanned hides were processed through a stainless steel spray booth

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in which a color coat and a top coat were applied. (Ehret, Tr. 9/15/94 at 62, 151.) The spray booths utilized solvent-based paints containing toluene, MEK, and methyl isobutyl ketone ("MIBK"). (Ehret, Tr. 9/15/94 at 43, 62; Ehret, Tr. 10/13/94 at 71.)

295. The spray booth had a water curtain to capture overspray. (Ehret, Tr. 9/15/94 at 37-38, 151; Ehret, Tr. 10/13/94 at 70.) At the end of a shift during which the spray booth operated, the water from the water curtain was drained and the slurry that remained was collected for disposal. (Ehret, Tr. 9/15/94 at 38, 49, 119-20; Ehret, Tr. 10/13/94 at 72-73.)

*31 296. After the finishing operation, the leather was trimmed to customer specifications. The scraps of leather which resulted from the trimming were discarded.

(2) Use of the Dorney Road Landfill

297. Arthur Arnold ("Arnold") hauled waste from Garden State's Fleetwood plant to the Site from February 1969 through December 1970.

a. Arnold began hauling Garden State's waste as an employee of Wilson K. Knoll ("Knoll") in 1968. Arnold testified that he hauled Garden State's waste to the Site during this time. (Arnold, Tr. 9/15/94 at 15, 29.) However, neither Arnold nor Knoll appears in the Selig Log prior to February 1969, except for one entry showing that Knoll used the Site in March 1967. (TPP 2.)

b. In 1969, Arnold purchased one of Knoll's trucks and began hauling refuse independently. (Arnold, Tr. 9/15/94 at 13, 14.) During the time period when Arnold hauled Garden State's waste on his own, he took the waste exclusively to the Site. (Arnold, Tr. 9/15/94 at 15-16.)

c. Arnold stopped taking Garden State's waste to the Site in 1970. (Arnold, Tr. 9/15/94 at 20-21.) Arnold never hauled waste to the Site after 1970. (Arnold, Tr. 9/15/94 at 23-24.)

d. Selig estimated that Arnold brought Garden State's waste to the Site for about two years. (Selig, Tr. 9/21/94 at 91-92.)

e. The Selig Log contains entries showing that Arnold disposed of waste at the Site each month from February 1969 through December 1970. (TPP 2.)

(3) Waste Disposed at the Site

(a) Volume

298. Garden State's waste was stored in 55-gallon drums for disposal. (Arnold, Tr. 9/15/94 at 17.) The drums were full of liquid when Arnold transported them to the Site. (Arnold, Tr. 9/15/94 at 25.)

299. Arnold testified that he usually transported waste from the Fleetwood plant once or twice each week. He never picked up the waste more than twice a week. (Arnold, Tr. 9/15/94 at 19.) Based on this testimony, the court finds that Arnold hauled Garden State's waste, on average, one and one half times each week.

300. Arnold could fit twelve drums on his truck. The truck was full every time he hauled drums from Garden State. (Arnold, Tr. 9/15/94 at 19, 25-26.)

301. Garden State's waste had a density of 1,688 lbs/cu.yd. because it was predominantly liquid. (TPP 960; TPP 199(a), Attachment 2A.)

302. Garden State disposed of 413.73 tons of waste at the Site. (55 gallons/drum x 12 drums/load x 1.5 loads/week x 100 weeks = 99,000 gallons) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (1,688 lbs/cu.yd.) x (1 ton/2,000 lbs.)

(b) Content

303. The parties have stipulated that, during the relevant time period, Garden State's waste streams included paint spray booth slurry as well as leather buffing dust containing chromium. *United States v. Atlas Minerals and Chemicals, Inc.*, C.A. No. 91-5118 (E.D. Pa. Oct. 27, 1993) (stipulation).

304. The parties additionally have stipulated that, during the relevant time period, Garden State used acetone, pigments, resins, binders, and solvents including toluene, MEK, and MIBK. *United States v. Atlas Minerals and Chemicals, Inc.*, C.A. No. 91-5118 (E.D. Pa. Oct. 27, 1993) (stipulation).

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*32 305. The buffing process typically produces buffing dust containing a significant amount of chromium. (TPD 214 at 104; TPD 199B, Attachment I.)

306. Garden State used acetone to clean the spray machines at the Fleetwood plant. Acetone that became contaminated through use was discarded in 55-gallon drums. The plant generated no more than one drum of waste acetone per week. (Engleman, Tr. 9/15/94 at 175-76.)

307. Some of the drums that Arnold hauled contained discarded rags that were used to clean equipment with solvents or to apply base coat to leather. (Engleman, Tr. 9/15/94 at 177.)

308. The drums of waste generally were separated at the plant so that empty drums and those containing acetone and solvents were set aside for recycling. However, drums containing solvent and acetone waste sometimes were mixed with the other drums and, consequently, taken to the Site. (Engleman, Tr. 9/15/94 at 179-82.)

309. During the time that Arnold was hauling Garden State's waste, he generally picked up all waste with the exception of empty drums and drums containing acetone or solvents. (Engleman, Tr. 9/15/94 at 174-75, 177.)

310. Most of the drums that Arnold hauled contained spray booth slurry, unusable base coat, and buffing dust. (Engleman, Tr. 9/15/94 at 177.) The court estimates that Arnold hauled approximately one drum per week containing waste solvent or acetone to the Site along with the drums containing slurry, buffing dust, and base coat.

311. Arnold testified that the liquid contained in the drums he hauled had a rotten odor. (Arnold, Tr. 9/15/94 at 18.) Garden State used a milk protein known as casein as a binder in its base coat. (Ehret, Tr. 10/13/94 at 66.) Casein breaks down quickly when exposed to air and has a strong, rotting odor. (Ehret, Tr. 10/13/94 at 67-68.)

312. Selig helped Arnold unload Garden State's drums once or twice. (Selig, Tr. 9/21/94 at 90.) From this experience, he described Garden State's waste as having a solvent-type odor. (Selig, Tr. 9/21/94 at 89.)

313. The spray booth slurry contained approximately 70-80% water during the period when Arnold was hauling it to the Site. (Ehret, Tr. 9/15/94 at 111-12; Ehret, Tr. 10/13/94 at 99-104.) In addition to water, the slurry contained low levels of solvents including MEK, MIBK, and toluene. (TPD 199B, Attachment I; *see* Ehret, Tr. 10/13/94 at 107-110.)

314. To summarize, based on all of the foregoing, the court finds the probable content of the drums that Arnold hauled to the Site from Garden State's Fleetwood plant on a weekly basis to be as follows:

4 drums of slurry from water-based base coat
8 drums of slurry from solvent-based color and top coat
1 drum of unusable base coat
3 drums of buffing dust
1 drum of scrap leather, rags, and plant trash
1 drum of waste acetone or solvent

315. Brown and Lowe assigned a waste strength score of '19' to Garden State's waste. (TPP 191) The court finds this score to be appropriate.

I. GENERAL ELECTRIC COMPANY

(1) *Ownership and Operations*

*33 316. Third-Party Plaintiff General Electric Company ("GE") is a corporation incorporated under the laws of the State of New York.

317. During the relevant time period, GE operated a plant located at 1801 South 12th Street in Allentown, Pennsylvania (the "Allentown plant"). At the Allentown plant, GE manufactured and assembled small household appliances. (TPD 224 at ¶ 1.)

318. The principal manufacturing processes that GE utilized during the relevant time period included the following: aluminum foundry operations, metal forming, nickel and chrome plating (including etching, electropolishing, and bright dipping), buffing and polishing, vapor degreasing, plastics molding, and assembly. (TPD 224 at ¶ 6.) Raw metal materials were formed and molded into various shapes. The metal forms were then degreased in one of several degreasing machines at the plant. The forms were plated with nickel or chrome, buffed and polished, and assembled. (TPD

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224 at ¶ 6.)

319. GE's Allentown plant operated about 49 weeks per year. (Iobst, Tr. 9/27/94 at 207 (plant open 47 weeks); Allison, Tr. 9/27/94 at 65 (plant closed 2-3 weeks).)

320. Edgar H. Iobst ("Iobst") worked for GE from 1951 until 1984. During the relevant time period, Iobst was GE's plant chemist. (Iobst, Tr. 9/27/94 at 125.) As plant chemist, Iobst was in charge of the chemical laboratory and controlled the plating operation, chemical finishing operations, and waste treatment operation. Beginning in 1972, his responsibilities included waste removal. (Iobst, Tr. 9/27/94 at 126.)

321. William VonBehren ("VonBehren") worked for GE from the late 1950s until 1984. During the relevant time period, he held a variety of positions including manager of manufacturing engineering, manager of shop operations, and manager of materials. He had some knowledge of GE's waste disposal practices, but no responsibility therefor and no knowledge of what landfills GE used. (VonBehren, Tr. 9/28/94 at 70-71.)

322. Brian Beregszazy ("Beregszazy") began working at GE's Allentown plant in 1973 as manager of plant engineering and maintenance. (Beregszazy, Dep. 3/29/93 at 14-15.)

(2) Use of the Dorney Road Landfill

323. Earl Engleman ("Mr. Engleman") worked at GE's Allentown plant from 1956 until 1984. (Engleman, Tr. 10/13/94 at 204.)

324. Mr. Engleman hauled waste from the Allentown plant from 1959 until 1965. (Engleman, Tr. 10/13/94 at 205.) He is absolutely sure that nobody else hauled GE's waste during that time, with the exception of a jobber who hauled cardboard waste from the plant. (Engleman, Tr. 10/13/94 at 209-10.) Mr. Engleman never took any of GE's waste to the Dorney Road Landfill. (Engleman, Tr. 10/13/94 at 206.)

325. Gary Allison ("Allison") worked at GE's Allentown plant beginning in 1967. (Allison, Tr. 9/27/94 at 46.) Although GE's waste was transported primarily by an outside contractor, Allison

occasionally hauled certain waste from the Allentown plant between 1968 and 1972. (Allison, Tr. 9/27/94 at 47, 50, 103-04, 121.)

*34 326. Allison's affinity for snakes and his concomitant proclivity for bringing snakes to work earned him the sobriquet "Snake Man." (Allison, Tr. 9/27/94 at 98-99; Selig, Tr. 9/21/94 at 118.)

327. GE fired Allison in 1972 after he was involved in an altercation with a night foreman in the waste water treatment plant. (Allison, Tr. 9/27/94 at 118-19.) Following a brief period of exile from the GE plant, Allison began hauling GE's waste as an employee of Robert J. McAuliffe Hauling ("McAuliffe Hauling") sometime in 1972. (Allison, Tr. 9/27/94 at 72-73.)

328. Allison testified that there was a good deal of ill will between him and GE after he was fired. (Allison, Tr. 9/27/94 at 119-20.) Although the court regards Allison's testimony with some measure of caution, it will not discredit the testimony entirely, particularly where other evidence tends to corroborate Allison's account.

329. Lou Novak ("Novak") hauled GE's waste during the late 1960s, until 1969 or 1970. (McAuliffe, Tr. 9/28/94 at 36; see Allison, Tr. 9/27/94 at 103-04 (outside contractor hauled GE's waste during 1968 - 1970 time period).) Novak never brought GE's waste or any other waste to the Dorney Road landfill. (Selig, Tr. 9/21/94 at 123.)

330. Robert McAuliffe ("McAuliffe") recalls that his company, McAuliffe Hauling, began hauling GE's waste in January or February of 1970. (McAuliffe, Tr. 9/28/94 at 33.) Between 1970 and 1972, Allison hauled some of GE's waste as a part-time employee of McAuliffe Hauling. (Allison, Tr. 9/27/94 at 61.)

331. McAuliffe took all of GE's waste to the Dorney Road landfill. (McAuliffe, Tr. 9/28/94 at 33.) The first entry in the Selig Log for McAuliffe Hauling is February 1970. (TPP 2.) No entries for GE or McAuliffe Hauling appear in the Mabry Log. (TPP 3.)

332. In September 1975, McAuliffe sold part of his hauling business to Allison. Allison operated the business as McAuliffe Hauling, Incorporated

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("McAuliffe, Inc."). GE was one of the commercial accounts that McAuliffe, Inc. took over from McAuliffe Hauling. (Allison, Tr. 9/27/94 at 75; McAuliffe, Dep. 12/6/91 at 11-12.)

333. Allison continued to haul GE's waste to the Dorney Road landfill until the Site ceased accepting waste. (Allison, Tr. 9/27/94 at 75; Selig, Tr. 9/21/94 at 108-09; *see* TPP 2 (last entry for McAuliffe in December 1978).)

334. Some GE documents provide that GE's waste stopped going to the Site in September or October of 1978; however, in each instance the reference appears to have been intended to approximate the date on which the Site closed. (TPP 1204 at GE0003884 (arrangement with McAuliffe Hauling "continued until 1978 when the Oswald site was sold and closed"); TPP 1204 at GE0003886 ("This Oswald disposal arrangement lasted up until October 1978 ... [w]ith the closing of the Oswald site, sludge is now being hauled [elsewhere]."); TPP 1205 at GE0009740 (listing date Site used as "late 1960's - Sept. 1978 (closed).") Therefore, these documents are not inconsistent with the court's finding that GE's waste was disposed of at the Site until the Site closed.

*35 335. Reeser began hauling GE's waste after GE had terminated its contract with a person whom Reeser knew only as "Snake Man." (Reeser, Heleva Dep. 1/12/88 at 54.)

336. No haulers other than McAuliffe and Allison disposed of GE's waste at the Site. (Oswald, Tr. 9/21/94 at 45.)

337. Notwithstanding some equivocal testimony to the contrary (Reeser, Heleva Dep. 1/12/88 at 55), the court finds that Reeser never hauled GE waste to the Site. (Selig, Tr. 9/21/94 at 123; Reeser, Atlas Dep. 12/5/91 at 62; Ryder, Tr. 12/9/93 at 228-30.)

(3) Waste Disposed at the Site

338. GE has admitted that, during the relevant time period, waste from the Allentown plant included plant trash, degreaser sludge, electroplating sludge, solvent waste, waste oils, and buffing and polishing dirt. (TPD 223 at ¶¶ 7, 39, 75 & 82; TPD 224 at ¶ 9.)

339. GE paid McAuliffe Hauling a flat monthly rate for hauling plant trash and sludge; McAuliffe charged GE separately for hauling drummed waste. (McAuliffe, Tr. 9/28/94 at 36-37; *see* TPD 370.) McAuliffe, Inc. continued the practice of billing GE separately for drummed waste. (Allison, Tr. 9/27/94 at 113, 118.)

340. During the period that McAuliffe Hauling was handling GE's waste, McAuliffe met several times each year with a GE representative who always asked him where the waste was going. (McAuliffe, Tr. 9/28/94 at 22-23.)

341. GE disposed of 16,858.24 tons of waste at the Site. The components of GE's waste are as follows:

(a) Plant Trash

342. GE's plant trash included general refuse including cafeteria waste, paper waste, broken appliances, plastic, cardboard, and wood. (TPD 224 at ¶ 9; McAuliffe, Tr. 9/28/94 at 23-24.)

343. GE generated a substantial amount of cardboard waste, most of which was culled from the plant trash and transported to a location other than the Site. (Allison, Tr. 9/27/94 at 76-77; McAuliffe, Tr. 9/28/94 at 22-23.) Some cardboard was also disposed of at the Site. (McAuliffe, Tr. 9/28/94 at 41.)

344. GE admitted that the waste generated by the Allentown plant included buffing dirt. (TPD 223 at ¶ 82.) GE also admitted that the buffing dirt contained nickel. (TPD 223 at Supp. ¶ 84.)

345. The buffing dirt was disposed of in cardboard drums which were thrown in with the plant trash. (Iobst, Tr. 9/27/94 at 149; Beregszazy, Dep. 3/29/93 at 125.)

346. On the average, GE generated about 15 compacted cubic yards of plant trash each day, which was disposed of at the Site. (McAuliffe, Tr. 9/28/94 at 23, 40; McAuliffe, Dep. 12/6/91 at 117-19; *see* Selig, Tr. 9/21/94 at 127 ("at least ten" ccy per day).)

347. McAuliffe generally hauled GE's plant trash to the Site five days per week. (TPD 295; McAuliffe, Tr. 9/28/94 at 39.) Although McAuliffe's contract

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called for hauling twice a day, the second pick-up was rarely necessary; in any event, the amount of plant trash taken to the Site as a result of the occasional second trip is inconsequential. (McAuliffe, Tr. 9/28/94 at 33.) Allison continued this practice. (TPP 1209) Allison never hauled plant trash twice a day. (Allison, Tr. 9/27/94 at 94.)

*36 348. The court finds that between February 1970 and December 1978, GE disposed of 75 ccy of plant trash per week (15 ccy/day x 5 days), or 3,675 ccy per year (75 ccy/week x 49 weeks/year). Over nine years, excluding January 1970 (for which the court deducted an estimated four weeks), GE disposed of 32,775 compacted cubic yards of plant trash. (3,675 ccy/yr x 9 yrs) - (75 ccy/week x 4 weeks.)

349. GE's plant trash had a density of 350 lbs/cu.yd. (TPP 199(a), Attachment 2A, Attachment 2B.)

350. GE disposed of approximately 5,736 tons of plant trash at the Site between February 1970 and December 1978. (32,775 ccy) x (350 lbs/ccy) x (1 ton/2,000 lbs)

351. Brown and Lowe assigned a waste strength score of '7' to GE's plant trash. (TPP 191) The court finds this score to be appropriate.

(b) Drummed Waste

352. McAuliffe Hauling disposed of drummed waste from GE's Allentown plant at the Site approximately twice each year. (Allison, Tr. 9/27/94 at 105-06; McAuliffe, Tr. 9/28/94 at 24; Selig, Tr. 9/21/94 at 112.)

353. All of this waste was contained in 55-gallon drums. (McAuliffe, Tr. 9/28/94 at 27; Beregszazy, Dep. 3/29/93 at 41.)

354. The drums contained mostly solvents and waste oils. (Iobst, Tr. 9/27/94 at 166-67; Selig, Tr. 9/21/94 at 115-17.)

355. The record clearly shows that McAuliffe hauled drummed waste from GE's Allentown plant during the years 1972, 1973, and 1974. (TPD 370; TPP 736.)

356. The court finds that McAuliffe Hauling also hauled GE's drummed waste in 1970 and 1971, based on the following:

a. McAuliffe was the only hauler servicing GE in 1970 and 1971.

b. McAuliffe testified at trial, "I don't remember hauling any drums the first few years I had the contract." (McAuliffe, Tr. 9/28/94 at 26.) When pressed, he stated, "I'm not sure, but I don't remem -- I don't recall hauling any." (*Id.*) This testimony, standing alone, is insufficient to support a finding that McAuliffe hauled no drums in 1970 or 1971.

c. Allison testified that McAuliffe hauled GE's drummed waste from 1970 until 1972. (Allison, Tr. 9/27/94 at 62.)

357. Beginning in 1975, the drummed waste generated by GE's Allentown plant was not disposed of at the Site except on very rare occasions, based on the following:

a. McAuliffe testified that he could not recall hauling any drums in the last year that he hauled GE's waste, which was 1975. (McAuliffe, Tr. 9/28/94 at 25.) As noted above, the court questions the precision of McAuliffe's testimony; however, in this aspect it is amply supported by other evidence.

b. In 1975, Edgar Iobst ("Iobst") assumed responsibility for directing where GE's hazardous waste was to be disposed. (Iobst, Tr. 9/27/94 at 127.)

c. Iobst arranged to have waste oil removed from the Allentown plant by haulers other than McAuliffe, Allison, or Reeser. Instead of hauling the waste in drums, these haulers would empty the drums into tank trucks. Iobst would then arrange for disposal of the empty drums. (Iobst, Tr. 9/27/94 at 188-89, 209-12.)

*37 d. Third-Party Plaintiffs have offered records which memorialize liquid waste being hauled by haulers other than McAuliffe, Allison, or Reeser after 1975:

i. In May 1976, a hauler not associated with the Site removed 3,400 gallons of "contaminated waste material" and 600 gallons of salvageable oil waste

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from GE's Allentown plant. (TPP 1203.)

ii. In March 1977, a hauler not associated with the Site removed 1,750 gallons of trichloroethylene from GE's Allentown plant. (TPP 1207 at GE0013974, GE0013979.)

iii. In May 1978, a hauler not associated with the Site removed 700 gallons of "oil, water and chemicals" from GE's Allentown plant. (TPP 1206 at GE0013957, GE0013958.)

e. An internal memorandum dated August 31, 1976 which was prepared by Peter Lubin ("Lubin"), GE's plant manager at the time, states that "our waste oils are placed in drums and removed by Oil Waste Service for the past one and a half years." (TPP 1201) The memorandum also states that "[e]arlier this year, accumulated oils, solvents, and other chemicals were removed by Rollins Environmental Services in New Jersey." (TPP 1201)

f. The McAuliffe purchase order, which covers the period from October 1972 until September 1978, reflects no separate charges for hauling drums after November 1974. (TPP 736)

g. Allison testified that he hauled drums to the Site only on very rare occasions after he began operating as McAuliffe, Inc. in 1975. (Allison, Tr. 9/27/94 at 114.)

358. Based on the foregoing, the court finds that McAuliffe Hauling removed drummed waste from GE's Allentown plant and disposed of the drums at the Site only from 1970 to 1974.

(i) Volume of Drummed Waste

359. The record upon which the court must rely to determine the volume of drummed waste which GE disposed of at the Site is far from clear. Therefore, the court will estimate the volume of drummed waste based on the evidence adduced at trial.

360. The drums ranged from completely empty to completely full. (Iobst, Tr. 9/28/94 at 17.)

361. The rate which McAuliffe Hauling charged GE for hauling drums depended on the number of drums. (McAuliffe, Tr. 9/28/94 at 37; see TPD 370; TPP 736.) McAuliffe charged GE the same

rate for the drums whether they were empty or full. (McAuliffe, Tr. 9/28/94 at 37.)

362. The court finds that McAuliffe Hauling removed 818 drums from GE's Allentown plant between 1972 and 1974, based on the following:

a. A summary of McAuliffe's invoices shows that McAuliffe Hauling charged GE for removal of 123 drums from GE's Allentown plant in September 1972, 106 drums in December 1972, 93 drums in June 1973, 196 drums in October 1973, 48 drums in March 1974, 132 drums in May 1974, and 120 drums in October 1974. (TPD 370 at GE0009769-70.)

b. The GE purchase order under which McAuliffe Hauling and McAuliffe, Inc. hauled GE's waste is consistent with McAuliffe's invoices insofar as it reveals that McAuliffe Hauling removed 123 drums from the Allentown plant in September 1972 and 106 drums in December 1972. (TPP 736 at GE0009834.) The purchase order also shows that McAuliffe Hauling removed 48 drums in March 1974 (*id.* at GE009870), 132 drums in June 1974 (*id.*), and 120 drums in November 1974. (*id.* at GE0009873.)

*38 c. McAuliffe's testimony as to the number of drums that his company picked up from the Allentown plant was imprecise at best; however, he did state that he hauled GE's drums about twice a year and that at times there would be up to 90 drums. (McAuliffe, Tr. 9/28/94 at 24-25.) This is not inconsistent with the numbers reflected on the purchase order and invoices.

363. There are no invoices or other records in evidence from which the court can calculate the exact volume of drums hauled from GE's Allentown plant in 1970 and 1971. Therefore, the court will use the volume from the three subsequent years to estimate the number of drums hauled from the plant during 1970 and 1971. As the court stated above, McAuliffe Hauling remove 818 drums from the Allentown plant between 1972 and 1974. Therefore, McAuliffe Hauling removed an average of 272.66 drums from the Allentown plant per year.

364. The total number of drums removed from GE's Allentown plant from 1970 through 1974 was approximately 1,363.30. (272.66 drums/year x 5

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years)

365. McAuliffe Hauling took all of GE's drums that were ultimately disposed of as waste to the Site. (McAuliffe, Tr. 9/28/94 at 38.)

366. McAuliffe testified that only 30% of the drums his company picked up at GE's Allentown plant actually went to the Site. (McAuliffe, Tr. 9/28/94 at 43-45.) The court finds, however, that McAuliffe underestimated the number of GE's drums which were disposed of at the Site, for the following reasons:

a. McAuliffe testified that if any drums were empty, he kept them instead of sending them to the Site. (McAuliffe, Tr. 9/28/94 at 39, 44.) He estimated that 40% of the drums which GE disposed of were empty. (McAuliffe, Tr. 9/28/94 at 26, 44-45, 56-58.)

b. McAuliffe further testified that he kept or sold "50 percent of the remaining 60 [percent]" of the drums, which contained used hydraulic oil, rather than taking them to the Site. (McAuliffe, Tr. 9/28/94 at 45.) He kept the hydraulic oil to use on his own trucks or, alternatively, sold the oil for use on dirt roads. (McAuliffe, Tr. 9/28/94 at 38-39.) McAuliffe stated that he either sold or used "at least 30 percent" of the drums. (McAuliffe, Tr. 9/28/94 at 43.)

c. If the court were to accept McAuliffe's testimony that only 30% of GE's drummed waste ended up at the Site, the total number of GE's drums disposed at the Site between 1970 and 1974 would be approximately 409. (.30 x 1,363.30 drums)

d. However, the court finds that McAuliffe's 40% estimate for the number of empty drums is inexact. McAuliffe personally hauled GE's drums only once. (McAuliffe, Tr. 9/28/94 at 51-52.) Although McAuliffe inspected a substantial number of GE's drums before they were taken to the Site, he also relied heavily upon his employees' observations to inform his recollection. (McAuliffe, Tr. 9/28/94 at 54-57, 64-65.)

e. The court also finds McAuliffe's testimony regarding how many drums of oil he kept or sold to be imprecise. McAuliffe admitted that this number would be "pretty hard to estimate." (McAuliffe, Tr.

9/28/94 at 39.) When he stated, "I think it would -- I know it would have been at least 30 percent," this amounted to little more than a guess. (*Id.* at 43.) Additionally, McAuliffe testified previously that he did not know what the percentage was:

*39 Q: ... Do you know what percentage of the oil you used and what percentage went to Oswald?

A: No, I don't. I can tell you that we kept a good percentage of hydraulic oil because we could use that in our trucks, you know, on hydraulic systems.

Q: Can you say whether less than half or over half went to Oswald?

A: I don't know what the percentage would be. Like I said, I had people that wanted it for the roads.

(McAuliffe, Dep. 12/6/91 at 120-21.)

367. Selig testified at trial that McAuliffe Hauling brought GE's drummed waste to the Site twice each year. (Selig, Tr. 9/21/94 at 112.) Each time, McAuliffe would bring three or four trucks, each carrying 15-20 drums. (Selig, Tr. 9/21/94 at 113-14.) Selig testified previously that the truck in which McAuliffe's drivers hauled drums could fit "[a]bout a dozen" drums. (Selig, Dep. 10/19/92 at 381.)

a. According to Selig's testimony, the number of drums hauled from GE's Allentown plant which were disposed of at the Site could be anywhere between 360 - 800 drums, based on the following calculation:

i. bottom of range: 3 trucks/trip x 12 drums/truck x 2 trips/year x 5 years = 360 drums;

ii. top of range: 4 trucks/trip x 20 drums/truck x 2 trips/year x 5 years = 800 drums.

368. McAuliffe's estimate of 409 drums is within the range derived from Selig's testimony. However, as the court noted above, McAuliffe's estimates are questionable. The court will place its estimate of the total number of drums at the midpoint of the Selig range.

369. Based on the foregoing, the court finds that GE disposed of approximately 580 drums at the Site.

370. As noted above, not all of the drums that GE disposed of were completely full. (McAuliffe, Tr. 9/28/94 at 45; Iobst, Tr. 9/28/94 at 17.) The court accepts Third-Party Plaintiffs' estimate that, on

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average, drums disposed of at the site were three-quarters full. Accordingly, each drum contained approximately 41.25 gallons of waste. (55 gallons/drum x .75)

(ii) Contents of Drums

371. The evidence before the court pertaining to the drums' contents is even more deficient than the evidence relevant to the total volume of drummed waste. Nonetheless, the court estimates that GE's drummed waste was comprised of:

- 10,023.75 gallons, or 62.04 tons, of solvents;
- 13,571.25 gallons, or 50.4 tons, of hydraulic fluid and other waste oils;
- 412.5 gallons, or 2.55 tons, of degreaser sludge.

The bases of these findings are detailed below, in subsections (A), (B) and (C).

372. Third-Party Plaintiffs rely heavily on the McAuliffe invoice summary, which characterizes certain groups of drums as containing certain types of waste. (TPD 370.) However, the court will disregard these designations as unreliable for the following reasons:

a. McAuliffe charged GE according to the number of drums he picked up at the Allentown plant. Therefore, the invoices are reliable to establish the number of drums which McAuliffe hauled from the plant, since that was their very purpose. However, McAuliffe had no reason to specify the contents of the drums for purposes of billing GE.

*40 b. During the period when the drums were being hauled to the Site, the drums were not labeled or separated when awaiting removal at the plant. (Allison, Tr. 9/27/94 at 56; Iobst, Tr. 9/27/94 at 170-71, 178; VonBehren, Tr. 9/28/94 at 87.) Therefore, it would be highly unlikely that McAuliffe would haul, e.g., 93 drums containing exclusively solvent at one time.

373. Instead, the court will examine other evidence adduced at trial in order to assess the contents of the drums.

(A) Degreaser Sludge

374. GE operated a vapor degreaser at the Allentown plant which generated a gray, powdery

sludge ("degreaser sludge") that was disposed of as waste. (Iobst, Tr. 9/27/94 at 146.)

375. The degreaser sludge contained trichloroethylene ("TCE"). (Iobst, Tr. 9/27/94 at 147-48.)

376. Between 1970 and 1974, approximately one and one-half drums full of degreaser sludge were disposed of along with the rest of the drummed waste per year, based on the following:

a. The vapor degreaser was cleaned out approximately twice each year. After each cleaning, approximately one half of one 55-gallon drum full of degreaser sludge was removed from the vapor degreaser and stacked along with the other drums to await removal. (Iobst, Tr. 9/27/94 at 147.) On balance, the degreasing operation produced very little sludge. (Beregszazy, Dep. 3/29/93 at 49-50.)

b. Iobst testified at one point that two half-drums of degreaser sludge were produced each year but later stated that four full drums were produced each year. (Iobst, Tr. 9/27/94 at 213.) The court finds the lower estimate to be more accurate, when considered in conjunction with Beregszazy's conception of the degreasing operation.

377. GE's degreaser sludge had a density of 2,500 lbs./cu.yd. (TPP 199(a), Attachment 2A.)

378. GE disposed of a total of 7.5 drums of degreaser sludge at the Site. (1.5 drums/year x 5 years) This amounts to 412.5 gallons. (7.5 drums x 55 gallons/drum) Thus, GE disposed of 2.55 tons of degreaser sludge at the Site. (412.5 gallons) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (2,500 lbs/cu.yd.) x (1 ton/2,000 lbs.)

379. Brown and Lowe assigned a waste strength score of '51' to GE's degreaser sludge. (TPP 191; see TPP FOF at ¶ 478 (including degreaser sludge in GE's "Waste Stream F" which includes solvents).) The court finds this score to be appropriate.

(B) Solvents

380. GE disposed of ethylene glycol which it used in its foundry operation at the Allentown plant. (Iobst, Tr. 9/27/94 at 166.) In addition, GE

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disposed of alcohol and thinners. (TPD 249)

381. Iobst testified that ethylene glycol, trichloroethane, and trichloroethylene were disposed of in drums prior to 1975. (Iobst, Tr. 9/27/94 at 166-67.) GE's waste solvents contained predominantly trichloroethylene. (Wagner, Tr. 2/9/94 at 15.)

382. Selig testified that some of the drums that GE disposed of at the Site had a very strong chemical smell and would make his eyes water if he got too close to them. (Selig, Tr. 9/21/94 at 115-16.)

*41 383. Allison testified that some of the liquid waste had a chemical odor and was "[v]aporous ... used to make you feel light headed and stuff." (Allison, Tr. 9/27/94 at 54.)

384. GE's solvents had a density of 2,500 lbs/cu.yd. (Wagner, Tr. 2/9/95 at 15; TPP 199(a), Attachment 2A.)

385. In a hazardous waste permit application prepared in 1981, GE estimated that it disposed of 33 tons of F001, F002, F003, and F005 RCRA listed hazardous waste each year. (TPD 227, TPP 737(a); see 40 C.F.R. § 261.31.) Relying on this document, Third-Party Defendants assume that GE disposed of 33 tons of solvents (including degreaser sludge) each year during the relevant time period. (TPD Brief at 201.) However, the court rejects this figure as implausible for the following reasons:

a. Thirty-three tons of solvent per year, applying Wagner's formula, would amount to 26,658.72 gallons over five years. (165 total tons (33 tons/yr. x 5 years) = X gal. x 1 cu.ft./7.48 gal. x 1 cu.yd./27 cu.ft. x 2500 lbs./cu.yd. x 1 ton/2,000 lbs.) This exceeds the total amount of drummed waste that GE disposed of at the Site, which the court has estimated to be around 24,000 gallons.

b. The numbers reflected on this document are not supported by any other evidence regarding the volume of solvent waste disposed of at the Site.

c. The permit application includes a description of each waste; however, the descriptions of the F001, F002, F003, and F005 wastes are illegible.

386. Because the court has reservations about the

documentary evidence offered by both parties as to the volume of GE's solvent waste, it will estimate the volume from the testimony taken at trial. Based on the following, the court estimates that 25% of the drummed waste *removed* from GE's Allentown plant was comprised of solvents:

a. Mr. Engleman testified that, during the time period when he was hauling GE's waste, solvents constituted 20-25% of GE's liquid waste. (Engleman, Tr. 10/13/94 at 206, 210, 212-13.)

b. Iobst testified that the majority of drummed waste at GE's Allentown plant prior to 1975 was oil. (Iobst, Tr. 9/27/94 at 166.)

c. McAuliffe testified that a large number of GE's drums contained hydraulic oil. (McAuliffe, Tr. 9/28/94 at 37-38.)

387. Of the 1,363.3 drums that McAuliffe Hauling picked up from GE's Allentown plant, only 580 went to the Site. McAuliffe kept or sold the remaining 783.3 drums. The court estimates that half of the drums which McAuliffe kept or sold were empty (this amounts to about 29% of the total drums that GE disposed of, whereas McAuliffe estimated that 40% of the drums were empty). Therefore, McAuliffe kept or sold 391.65 drums of oil. For the sake of consistency, the court will assume that these drums, on the average, contained 41.25 gallons each, as did the drums which were disposed of at the Site.

388. Of the 971.65 drums which were not empty (580 disposed + 391.65 kept/sold), 25% contained solvents. Therefore, the court estimates that 243 drums containing solvents were disposed of at the Site. This amounts to 10,023.75 gallons (243 drums x 41.25 gallons/drum). Applying Wagner's formula, GE disposed of 62.04 tons of solvent at the Site. (10,023.75 gallons) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (2,500 lbs/cu.yd.) x (1 ton/2,000 lbs.)

*42 389. Brown and Lowe assigned a waste strength score of '51' to GE's solvent waste. The court finds this score to be appropriate.

(C) Waste Oil

390. GE's Allentown plant generated waste oils

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during the relevant time period. (TPD 236; TPD 249 at 7; VonBehren, Tr. 9/28/94 at 86.)

391. GE generated a substantial amount of waste oil because of the "tremendous number of hydraulic machines that would require ... the removal of the oil in replacing it with new oil" (VonBehren, Tr. 9/28/94 at 86.) The waste hydraulic oil was stored in drums. (VonBehren, Tr. 9/28/94 at 87.)

392. GE's waste oil had a density of 1,500 lbs./cu.yd. (TPP 199(a), Attachment 2A.)

393. As the court discussed above, GE disposed of a total of 580 drums of liquid waste at the Site, 7.5 of which contained degreaser sludge and 243 of which contained solvents. The rest of the drums contained oil. Therefore, 329 of the drums which GE disposed of at the Site contained oil.

394. GE disposed of 50.4 tons of waste oil at the Site. (329 drums x 41.25 gallons/drum) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (1,500 lbs/cu.yd.) x (1 ton/2,000 lbs.)

395. Brown and Lowe assigned a waste strength score of '15' to GE's waste oil. The court finds this score to be appropriate.

(c) Electroplating Sludge

396. During the relevant time period, GE's waste included sludge from the electroplating process which had been processed through a waste water treatment plant. (TPD 223 at ¶ 7.) The treatment plant removed heavy metals from the waste in the form of a sludge ("electroplating sludge"). (Iobst, Tr. 9/27/94 at 130.)

397. GE's electroplating sludge was a green semi-solid material. (Allison, Tr. 9/27/94 at 48; McAuliffe, Dep. 12/6/91 at 77; Reeser, Dep. 12/5/91 at 183; *but see* Reeser, Heleva Dep. 1/28/88 at 16 ("Blue greenish, aqua, almost.") The electroplating sludge exited the wastewater treatment plant on a slow-moving conveyor belt and fell from the conveyor belt directly into a dump truck that was parked under the belt. (Allison, Tr. 9/27/94 at 48; Iobst, Tr. 9/27/94 at 180.)

398. GE's electroplating sludge contained significant levels of metals including iron, copper,

chromium, and nickel. (TPD 364; TPP 634; *see* TPD 223 at ¶¶ 15, 17, 18, 20.)

399. GE admits that the electroplating sludge was disposed of at the Site between 1970 and 1978. (TPD 223 at ¶¶ 36, 37, 38.)

400. Allison hauled electroplating sludge to the Site between 1968 and 1970, but only on rare occasions. (Allison, Tr. 9/27/94 at 47, 50, 103-04, 121.) During that period, the sludge was hauled in a GE-owned dump truck with a capacity of six to eight cubic yards. On those occasions when Allison hauled the sludge, the truck was not quite full. (Allison, Tr. 9/27/94 at 50-51.) The court estimates that Allison hauled five cubic yards of sludge to the Site approximately once every two months from 1968 until McAuliffe Hauling began hauling the sludge in 1970. Accordingly, the court finds that Allison transported a total of 60 cubic yards of electroplating sludge to the Site during that time period. (5 cu.yd./month x 12 months)

*43 401. Beginning in 1970, Allison hauled electroplating sludge to the Site on a daily basis as a part-time employee of McAuliffe Hauling. (Allison, Tr. 9/27/94 at 62.) In 1972, he continued to haul the electroplating sludge each day, as a full-time employee of McAuliffe Hauling. (Allison, Tr. 9/27/94 at 73.) After Allison began operating as McAuliffe, Inc., he continued to haul GE's sludge daily until the Site ceased accepting waste. (Allison, Tr. 9/27/94 at 88.)

402. From February 1970 until 1978, GE disposed of approximately five cubic yards of electroplating sludge at the Site per day, based on the following:

a. When McAuliffe Hauling began hauling GE's waste in 1970, the electroplating sludge was transported in a 5 cubic yard dump truck which was owned by McAuliffe Hauling. (Allison, Tr. 9/27/94 at 74; Selig, Tr. 9/21/94 at 120.)

b. The court notes that documentary evidence offered by GE estimates the amount of sludge transported to the Site to be slightly lower:

i. A report prepared by Iobst and another GE employee in 1968 stated that when the wastewater treatment facility began operating in 1954, it generated about 0.33 cubic yards of sludge per day.

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(TPP 737(y) at GE0014030.) The report stated that by 1968, this figure had increased to 3 cubic yards per day. (TPP 737(y) at GE0014033.) Additionally, Iobst testified that the electroplating sludge increased in volume gradually from the 1950s through 1980. (Iobst, Tr. 9/27/94 at 161.)

ii. Iobst's testimony revealed the 0.33 figure to be the result of a mathematical error:

Q: ... Now how did you determine nine cubic feet per day?

A: I think we had a three cubic yard truck. And in a day, we could fill the truck. So I think Anderson converted it back to cubic feet.

Q: All right. Well, in any event, if one uses 1954 as the number in this article, nine cubic feet per day, am I correct, that you divided by 27 to get cubic yards; is that correct?

A: Yeah.

Q: Okay, so that would be a third of a cubic yard back in 1954?

A: Yes.

(Iobst, Tr. 9/27/94 at 196-97.) Obviously, three cubic yards is three cubic yards. (3 cu.yd. = 3 cu.yd.)

iii. A 1974 DER inspection report states that GE disposed of 3 cubic yards of electroplating sludge at the Site per day. (TPP 652.)

iv. In a letter to DER dated May 4, 1977, GE estimated the volume of electroplating sludge to be 4 cubic yards per day. (TPP 640 at GE0000706.)

v. A waste disposal permit application that GE prepared in December 1978 estimated the volume of electroplating sludge to be 20 cubic yards per week. (TPP 634 at GE0000386.)

c. The court does not doubt that GE's documents were prepared in good faith. However, any evidence as to volume in this case can only be viewed as an approximation. Based on all the evidence regarding the electroplating sludge, the court finds that the volume was more likely to be five cubic yards per day than three or four.

*44 d. The hazardous waste permit application that GE prepared in 1981 estimated the annual volume of F006 waste, described as "sludge," to be 1,000 tons. (TPD 227, TPP 737(a); see 40 C.F.R. §

261.31.) This figure is substantially consistent with the court's finding that the Allentown plant generated about 1,163.75 tons of electroplating sludge each year (excluding Saturdays and other irregular disposal). (5 cu.yd./day x 5 days/week x 49 weeks/year x 1,900 lbs/cu.yd. x 1 ton/2,000 lbs.)

403. At times, the electroplating operation produced more waste than the treatment plant could handle; the waste then would be diverted to a lagoon at the Allentown plant. The liquid waste would eventually be pumped out to the treatment plant, leaving a residue in the lagoon. (Iobst, Tr. 9/27/94 at 141-42.) When the lagoon was closed in 1971 or 1972, the residue was dredged out and hauled to the Site. (Iobst, Tr. 9/27/94 at 143-44.) Iobst testified that the sludge from the lagoon was hauled to the Site in the regular dump truck and that the dredging took an entire day and required about ten trips to the Site. (Iobst, Tr. 9/27/94 at 145-46.) The court previously found that GE's dump truck could hold six to eight cubic yards. Under these circumstances, one would expect the truck to be filled to capacity on each trip. Therefore, the court finds that GE disposed of 70 cubic yards of sludge from the lagoon on this occasion in addition to the daily batch. (7 cu.yd./trip x 10 trips)

404. Beginning in 1970, Allison occasionally hauled sludge on Saturdays when the waste treatment plant ran independent of the main plant. (Allison, Tr. 9/27/94 at 78-79.) This is supported by Iobst's testimony that the excess electroplating waste that had been stored in the lagoon would be pumped into the waste treatment plant on weekends. (Iobst, Tr. 9/27/94 at 141.) The court finds that this probably occurred about once a month. Accordingly, these operations produced approximately 540 cubic yards of waste sludge that was taken to the Site. (5 cu.yd./Sludge Saturday x 12 Sludge Saturdays/year x 9 years)

405. GE's electroplating sludge had a density of 1,900 lbs/cu.yd. (TPP 199(a), Attachment 2A; see TPP 634 at GE0000387.)

406. GE disposed of 11,007.41 tons of electroplating sludge at the Site, based on the following:

a. 1968 - 1970 - (60 cu.yd.) x (1,900 lbs/cu.yd) x (1 ton/2,000 lbs) = 57 tons

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b. 1970 - 1978 - (5 cu.yd./day) x (5 days/week) x (49 weeks/year) x (9 years) x (1,900 lbs/cu.yd.) x (1 ton/2,000 lbs) = 10,473.75 tons

-less- January 1970: (5 cu.yd./day) x (5 days/week) x (4.33 weeks) x (1,900 lbs/cu.yd.) x (1 ton/2,000 lbs) = 102.84 tons

total 1970 - 1978 = 10,370.91 tons

c. Lagoon Sludge - (70 cu.yd.) x (1,900 lbs/cu.yd.) x (1 ton/2,000 lbs) = 66.5 tons

d. Saturday Sludge - (540 cu.yd.) x (1,900 lbs/cu.yd.) x (1 ton/2,000 lbs) = 513 tons

*45 407. Brown and Lowe assigned a waste strength score of '11' to GE's electroplating sludge. (TPP 191) The court finds this score to be appropriate.

(d) Other Waste

(i) Paint Sludge

408. GE added a non-stick coating operation to its manufacturing process at the Allentown plant in 1978. (TPP 737(d).)

409. The non-stick coating operation utilized paint spraying equipment to spray a water-based coating, similar to a Teflon coating, onto products. (Iobst, Tr. 9/27/94 at 156-57; TPP 670 at GE0004218, GE0004221.)

410. The overspray from the non-stick coating operation was referred to routinely as "paint sludge." No paint was used in the manufacturing operation at the Allentown plant. (Iobst, Tr. 9/27/94 at 151; Beregszazy, Dep. 3/29/93 at 65-66.)

411. The overspray from the coating operation was disposed of at a landfill other than the Site. (TPP 737(d); TPP 683; TPP 735.)

(ii) PCBs

412. GE did not manufacture PCBs at the Allentown plant or use PCBs in the manufacturing process. However, PCBs were present in electrical transformers. (Iobst, Tr. 9/27/94 at 158-59.)

413. The transformers were serviced by General Electric Services, a subsidiary of GE. General Electric Services disposed of any PCBs that leaked or were drained from the transformers. (Iobst, Tr. 9/27/94 at 159, 213.) The evidence does not suggest

that General Electric Services used the Site.

414. Third-Party Defendants introduced a document that listed PCBs as one of the substances disposed of at the Site. (TPD 903) However, this was the only evidence suggesting that GE disposed of PCBs at the Site, and the testimony contradicting this evidence is credible. Therefore, the court finds that GE disposed of PCBs at a location other than the Site.

J. THE GLIDDEN COMPANY

(1) *Ownership and Operations*

415. Third-Party Plaintiff The Glidden Company ("Glidden") is a corporation incorporated under the laws of the State of Delaware.

416. Glidden operated a plant at 3rd and Burn Streets in Reading, Pennsylvania (the "Reading plant"), where it manufactured and distributed paint. (Geib, Tr. 9/16/94 at 4.)

417. W. High Geib ("Geib") was plant manager of the Reading plant during the relevant time period. Geib was responsible for all phases of the plant's operation including manufacturing, distribution of raw materials, and quality control laboratories. The manager of the receiving and handling department, which was the department responsible for waste disposal, reported to Geib. (Geib, Tr. 9/16/94 at 5.)

418. Glidden's Reading plant had development laboratories which occupied one floor of one building and employed about thirty chemists. (Geib, Tr. 9/16/94 at 8.) Additionally, the Reading plant had three quality control laboratories. Three chemists worked in paint quality control, one in resin quality control, and one in lacquer quality control. (Geib, Tr. 9/16/94 at 13.)

419. Glidden manufactured solvent-based oil paint and water-based latex paint at the Reading plant. (Geib, Tr. 9/16/94 at 16.) During the 1966-67 time period, about half of the paint which Glidden manufactured was water-based latex paint. (Geib, Tr. 9/16/94 at 36.)

*46 420. Geib described the paint manufacturing process as follows: Pigment was brought to the plant in powder form. The pigment was mixed with a

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vehicle until the pigment was dispersed through the vehicle. The vehicle in water-based paints was latex, whereas the vehicle in solvent-based paints was varnish. The dispersed paint was mixed with thinners in large tanks with agitating paddles. Color was added to the paint in the same mixing tanks. (Geib, Tr. 9/16/94 at 14-16.)

421. The bulk of the varnish was manufactured at the Reading plant. (Geib, Tr. 9/16/94 at 16.) The basic resin for the varnish was originally in a solid form. The resin was heated in order to soften it and then dissolved in a solvent. It was further reduced with additional solvents and diluents. (Geib, Tr. 9/16/94 at 16.)

(2) *Use of the Dorney Road Landfill*

422. Glidden used outside contractors to haul the waste from its Reading plant. (Geib, Tr. 9/16/94 at 6.)

423. Anthony Damore ("Damore") was the principal hauler of Glidden's waste. (Geib, Tr. 9/16/94 at 6.) Damore hauled Glidden's waste from March 1948 until October 1983. (Damore, Tr. 9/16/94 at 40.)

424. Damore hauled Glidden's plant trash on a regular basis, but took it to a site other than the Dorney Road Landfill. (Damore, Tr. 9/16/94 at 51.) The only time Damore used the Site was between 1966 and 1967, when he took several loads of drummed waste there. (Damore, Tr. 9/16/94 at 44, 47.)

425. During the relevant time period, Glidden also engaged a firm called "Jonas" to haul its waste. (Geib, Tr. 9/16/94 at 7.) No evidence on the record suggests that Jonas ever used the Dorney Road landfill.

(3) *Waste Disposed at the Site*

(a) *Content*

426. The development laboratory at the Reading plant generated paint and varnish waste, as well as some lacquer waste. (Geib, Tr. 9/16/94 at 9.) These wastes were disposed of in 55-gallon drums. (Geib, Tr. 9/16/94 at 12.)

427. The paint waste generated by the development

laboratory generally would be stored in drums separate from the varnish waste. (Geib, Tr. 9/16/94 at 10.)

428. The development laboratory generated about four or five drums each day, including some paper waste and other general trash that was discarded in the lab. (Geib, Tr. 9/16/94 at 11.)

429. In the absence of any evidence as to the exact ratio of the contents of the drums from the development laboratory, the court estimates that half of the drums contained varnish waste and half contained paint waste. Of the drums containing paint waste, the court estimates that half contained waste from solvent-based paint, and half contained waste from water-based paint.

430. A laboratory attendant took the drums from the development laboratory when they were full and placed them in the yard, where they would be picked up for disposal. (Geib, Tr. 9/16/94 at 10.)

431. The quality control laboratories generated a minimal amount of paint and varnish waste. (Geib, Tr. 9/16/94 at 12-13.)

*47 432. The solvents and diluents that Glidden used in solvent-based paint included toluene, coal tar, some ester, and some methyl ethyl ketone. (Geib, Tr. 9/16/94 at 17.)

433. Approximately 80% of the volume of latex paint is comprised of water. (Geib, Tr. 9/16/94 at 34.)

434. Glidden used a pigment containing chromium in the manufacture of yellow paint. (Geib, Tr. 9/16/94 at 18.) Additionally, cadmium was used in some paints. (Geib, Tr. 9/16/94 at 18.)

435. The court finds that Glidden was not using lead in its paints at the time Damore hauled waste to the Site, except in small amounts as a drying agent. (Geib, Tr. 9/16/94 at 18-19.)

436. The tanks used to mix paint during the manufacturing process, which varied in size from 100 to 5,000 gallons, were cleaned occasionally with solvents and diluents, including xylene, naphtha, mineral spirits, coal tar, and toluene. (Geib, Tr. 9/16/94 at 24, 26.)

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437. The solvents used to clean the tanks were reclaimed by a recovery still which generated a sludge. (Geib, Tr. 9/16/94 at 24.) The sludge contained pigments and some solvents. (Geib, Tr. 9/16/94 at 26.) The sludge was disposed of in 55-gallon drums; about one drum full of sludge would accumulate each day. (Geib, Tr. 9/16/94 at 27.)

438. Occasionally, solvents could not be recovered and were disposed of in 55-gallon drums. (Geib, Tr. 9/16/94 at 25.)

439. The paint department sometimes disposed of paint skin which collected on the top of the paint in the mixing tanks. The skin, which contained pigments but not solvents, was disposed of in 55-gallon drums along with the sludge from the recovery still. (Geib, Tr. 9/16/94 at 29-30.)

440. Damore testified that the drums which he hauled were marked "liquid waste" and contained mostly liquid, but that the drums also contained some trash and dirt. (Damore, Tr. 9/16/94 at 44-45, 54.) This is supported by Geib's testimony that the development laboratory's trash was taken to the disposal area along with the drums containing paint and varnish waste. (Geib, Tr. 9/16/94 at 10.)

441. Brown and Lowe assigned a waste strength score of '38' to Glidden's paint waste. (TPP 191) The court finds this score to be appropriate.

442. The record does not support a finding that Glidden disposed of cans of paint at the Site.

a. Oswald testified that somebody hauled one-quart and one-gallon cans of paint to the Site during the period when Mabry was still operating the Site. The paint cans were labelled "Glidden". When he opened some of the cans, the paint had a very strong, rancid smell. (Oswald, Tr. 9/21/94 at 9-11, 39.)

b. Oswald does not know who brought the paint cans to the Site. (Oswald, Tr. 9/21/94 at 9.)

c. Before Selig began working at the Site, he occasionally visited the Site and used various refuse items for target practice. Selig recalls using Glidden paint cans for target practice in the sixties. (Selig, Tr. 9/21/94 at 76-77.)

*48 d. Selig does not know how the paint cans got

to the Site. (Selig, Tr. 9/21/94 at 153.)

e. Geib testified that Glidden very rarely, if ever, disposed of cans containing paint. (Geib, Tr. 9/16/94 at 21, 23.)

(b) Volume

443. Damore testified that he hauled four or five loads of 55-gallon drums from Glidden to the Dorney Road landfill. (Damore, Tr. 9/16/94 at 44.)

444. Damore used a stake body truck to haul Glidden's drums. (Damore, Tr. 9/16/94 at 50.) He could fit fifteen drums on the truck, and testified that he clearly recalls hauling fifteen drums on each trip. (Damore, Tr. 9/16/94 at 45, 54.)

445. The court finds that Damore hauled four loads of drums to the Site, for a total of 60 drums.

446. Based on the evidence discussed *supra*, the court finds that Glidden probably disposed of drums generally as follows: five drums per day from the development laboratory - one trash, one latex paint, one oil paint, and two varnish - and one drum per day of sludge from the recovery still. This comes to a total of six drums per day. Accordingly, the court finds that Damore probably disposed of drums which accumulated for about ten days.

447. Glidden's liquid waste had a density of 1,688 lbs/cu.yd. because it was predominantly liquid. (TPP 960; TPP 199(a), Attachment 2A.)

448. Glidden disposed of 11.49 tons of liquid waste, including sludge, at the Site. (50 drums x 55 gallons/drum = 2,750 gallons) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (1,688 lbs/cu.yd.) x (1 ton/2,000 lbs.)

449. The total amount of trash and dirt, which occupied the remaining drums, is 0.34 tons. (55 gallons/drum x 10 drums = 550 gallons) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (250 lbs/cu.yd.) x (1 ton/2,000 lbs.)

K. CLIFFORD HILL

450. Third-Party Defendant Clifford R. Hill ("Hill") is an individual who resides at 780 Noble Street in Kutztown, Pennsylvania.

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(1) *Operation of the Site*

451. As the court noted above, Oswald leased the Site from Mabry beginning in January 1967. (Oswald, Tr. 12/8/93 at 63-64.) Hill and Oswald operated the landfill as partners for about six months, from January 1967 until June 1967. (Hill, Dep. 3/5/93 at 32, 41-44, 50.) During that time, Hill acted as the landfill's bookkeeper and Oswald was responsible for day-to-day operations at the Site. (Hill, Dep. 3/5/93 at 24-29; TPP 2 (Hill's entries included in Selig Log).)

452. During the time that he operated the Site with Oswald, Hill received 50% of the landfill's profits and dumped trash there free of charge pursuant to a verbal agreement with Oswald. (Hill, Dep. 3/5/93 at 28-29, 51.)

453. The lease, to which Hill and Oswald were both signatories, was for a term of one year. However, Hill withdrew from the partnership in June 1967. Hill continued to dump trash at the Site, and the ledger shows that he was charged tipping fees beginning in July 1967. (TPP 2)

(2) *Use of the Dorney Road Landfill*

*49 454. During the relevant time period, Hill operated a trash hauling business. (Hill, Dep. 3/5/93 at 6-7.)

455. Hill began dumping trash at the Dorney Road landfill in the early sixties. (Hill Dep. 3/5/93 at 7.) Hill's name appears in the Mabry Log beginning October 1, 1965. (TPP 3) During the time that Mabry operated the landfill, Hill hauled approximately one load of trash to the Site per day. (Hill, Dep. 3/5/93 at 15.)

456. During the time that Mabry operated the Site, Hill used the Site exclusively. (Hill, Dep. 3/5/93 at 15.)

457. Prior to 1964, Hill hauled trash in a 5 ton dump truck. In 1964, Hill obtained a 13 cubic yard compactor truck, which he continued to use throughout the remainder of the relevant time period. (Hill, Dep. 3/5/93 at 9, 20.) Hill also purchased a brand new pickup truck in 1964. (Hill, Dep. 3/5/93 at 18.) In 1969, Hill obtained a 16 cubic yard compactor truck which he continued to

use throughout the remainder of the relevant time period. (Hill, Dep. 3/5/93 at 19, 20.) In 1972, Hill obtained a 20 cubic yard compactor truck, and continued to use it throughout the remainder of the relevant time period. (Hill, Dep. 3/5/93 at 19-20.)

458. The Site charged 50CENTS per compacted cubic yard prior to 1970. From 1970 through 1971, the Site charged 75CENTS per compacted cubic yard. In 1972, the price rose to \$1.00 per compacted cubic yard for the remainder of the relevant time period. (TPD 1536 at 4.)

459. The Mabry Log and the Selig Log reflect charges to Hill as follows:

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| | | |
|----------------|--------------|--------------------------|
| 10/65 - 6/6713 | | |
| 7,564 ccy | 1/70 - 12/71 | \$ 3,782 @ 50CENTS/ccy = |
| 8,941 ccy | 1/72 - 5/78 | \$ 6,706 @ 75CENTS/ccy = |
| 25,076 ccy | | \$25,076 @ \$1 /ccy = |
| TOTAL: | | |
| 41,581 ccy | | |

(TPP 2; TPP 3)

460. Hill hauled primarily MSW-type plant trash. (*See generally* Hill, Dep. 3/5/93 at 76-140.)

461. Commingled MSW has a density of 660 lbs/cu.yd when compacted in a truck. Loose MSW has a density of 250 lbs/cu.yd. (TPP 960)

462. Hill hauled 13,721.73 tons of waste to the Site between October 1965 and May 1978. (41,581 ccy x 660 lbs/ccy x 1 ton/2,000 lbs.)

463. A portion of the waste that Hill hauled to the Site was generated by other Third-Party Defendants. The court's review of Hill's testimony and supporting documents reveals no sound basis from which to calculate this volume. Dovell calculated the volumes based on a percentage of Hill's 1978 customer list. (TPD 1536) In the absence of more reliable evidence, the court accepts Dovell's estimates, which are as follows:

| | |
|-----------------------|-----------|
| Atlas-ESB (Mertztown) | |
| 519 lcy | |
| Eastern Industries | 41 ccy |
| Kutztown University | 524 ccy |
| Kleinert's Inc. | 2,246 ccy |
| Fegley | 41 ccy |
| Schwoyer | 41 ccy |
| TOTAL: | |
| + 519 lcy | 2,893 ccy |

The waste that Hill hauled for Third-Party Defendant generators amounts to approximately 1,019.57 tons. (2,893 ccy x 660 lbs/ccy x 1 ton/

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2,000 lbs) + (519 lcy x 250 lbs/cu.yd. x 1 ton/2,000 lbs.) Therefore, Hill hauled approximately 12,702 tons of MSW-type waste to the Site for customers who are not parties to this action. (13,721.73 total - 1,019.57 from TPD generators.)

*50 464. Brown and Lowe assigned a waste strength score of '7' to MSW, based on the presence of a wide variety of hazardous substances. (TPP 191) The court finds that this is an appropriate score for the waste that Hill hauled to the Site.

L. MACK TRUCKS, INC.

(1) *Ownership and Operations*

465. Third-Party Plaintiff Mack Trucks, Inc. ("Mack") is a corporation incorporated under the laws of the Commonwealth of Pennsylvania.

466. The parties have stipulated that Mack is a covered person under 42 U.S.C. § 9607(a)(3). (TPD 1532)

467. During the relevant time period, Mack disposed of waste at the Site from two truck assembly plants.

468. Mack operated a plant in Allentown, Pennsylvania (the "Mack Allentown plant") throughout the relevant time period. The Mack Allentown plant included the following buildings:

- a. Plants 3 and 3A - general machine shops that produced a variety of truck components;
- b. Plant 4 - encompassed the fire truck assembly line, the front and rear axle assembly lines, welding operations, sheet metal fabrication operations, shears, punch presses, and a fire truck paint booth;
- c. Plant 4A - two paint booths and a paint dip system for small parts;
- d. Plant 5 - various assembly lines and a variety of paint booths.

(Kline, Tr. 9/28/94 at 139-41, 146-47, 149, 154; TPD 1108.)

469. In May 1975, Mack opened a plant at Route 100 and Alverness Road in Macungie, Pennsylvania

(the "Macungie plant"). The Macungie plant operated throughout the remainder of the relevant time period. (Litzenberger, Tr. 9/29/94 at 69-72; Kline, Tr. 9/28/94 at 138.)

(2) *Use of the Dorney Road Landfill*

470. Mack hauled waste to the Site from its Allentown plant between March 1971 and April 1974. (TPD 1292 at ¶ 2; TPP 837; TPP 838; TPP 839.)

471. Mack employees hauled waste from the Mack Allentown plant to the Site in company-owned trucks. (Polkowski, Tr. 9/28/94 at 190.)

472. From the time the Macungie plant opened in May 1975 until October 1978, Hoch hauled plant trash from the Macungie plant to the Site on a regular basis. (Litzenberger, Tr. 9/29/94 at 104; Selig, 12/9/93 at 47-48, 67-68.)

(3) *Waste Disposed at the Site*

(a) *The Mack Allentown Plant*

473. The parties have stipulated that Mack disposed of 100,336 cubic yards of waste, weighing 9,409 tons, at the Site from its Allentown plant. (TPD 1292 at ¶ 2.) This stipulation does not preclude Third-Party Defendants from presenting evidence regarding the nature and amount of individual waste streams. (TPD 1292 at ¶ 10.) The stipulation does not account for any paint waste from the Mack Allentown plant that was disposed of at the Site. In accordance with the court's findings regarding paint waste, *infra*, the court finds that Mack disposed of 9,564 tons of waste at the Site as follows:

5,566.84 tons wood packaging & pallets hauled to Site in 40-cubic yard rolloff containers;

*51 193.24 tons paint sludge and liquid paint waste hauled to Site in 55-gallon drums, mixed with wood waste in 40-cubic yard rolloff containers;

3,087 tons general plant trash hauled to Site in 28-cubic yard rolloff containers;

717 tons loose waste materials including dried paint hauled to Site in 8-cubic yard open dump trucks and 6-cubic yard open pickup trucks.

(i) *Plant Trash*

474. The parties also have stipulated that the waste

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from the Mack Allentown plant consisted primarily of wood, paper, and cardboard packaging material. The waste included smaller quantities of plastic packaging, styrofoam, lunchroom waste, food waste, floor sweepings, metal banding from shipping containers, office trash, filmite coatings from paint booth walls, dry scrapings from paint booth walls, dried paint booth filters, and empty 5-gallon paint cans that sometimes contained paint residue. (TPD 1292 at ¶ 1.)

475. Mack began recycling waste metal separately from general plant trash at its Allentown plant before Mack began hauling its waste to the Site. (TPP 844) However, some small metal pieces that fell on the floor including nuts, bolts, and small clipped pieces of copper tubing, were swept up and thrown in the trash. (TPD 1292 at ¶ 1; Kline, Tr. 9/28/94 at 181-82.)

476. Painted truck parts such as hoods, fenders, and cabs were sanded at the plant with jitterbugs. Powder residue from the sanding operation fell to the floor and was swept up and placed in the trash. (Pirl, Dep. 3/25/93 at 49-50.)

477. Speedy Dry and rags that were used to clean up gear oil and antifreeze spills sometimes were thrown in the trash. (Pirl, Dep. 3/25/93 at 43-45.)

478. Mack used a dump truck and several 28-yard and 40-yard rolloff containers to haul its waste to the Site. (Selig, Tr. 9/21/95 at 94-95; Polkowski, Tr. 9/28/94 at 189-90.) Mack stopped taking the rolloff containers to the Site at the end of January 1973. (TPP 839 at MT0042.) Mack continued to take waste to the Site in dump trucks until April 1974. (TPP 839 at MT0043 - MT0494; TPD 1292 at ¶ 2.)

(ii) Paint Waste

479. From at least 1972 through May 1975, a dry paint booth was in operation in Plant 4. (Kline, Tr. 9/28/94 at 140, 141-42.) Plant 4A had a dry paint booth and a large wet paint booth. (Kline, Tr. 9/28/94 at 146, 149-50.) Plant 5C had two dry paint booths and five wet paint booths. (Kline, Tr. 9/28/94 at 154, 161-63; Pirl, Dep. 3/25/93 at 31.)

480. In the dry paint booths at the Mack Allentown plant, paint is captured by paper filters or metal

baffles. During the relevant time period, baffles were cleaned routinely either by physically scraping the paint from them or by dipping them in a cleaning tank. (Kline, Tr. 9/28/94 at 142-44.) Dried paint that was scraped from the baffles was discarded in 55-gallon drums. (Kline, Tr. 9/28/94 at 152.) When filters were no longer useful, they were removed from the booths and discarded in 55-gallon drums. (Kline, Tr. 9/28/94 at 162-63.)

*52 481. The Mack Allentown plant utilized solvent-based paints. (Kline, Tr. 9/28/94 at 165.) Solvents including xylene, toluene, acetone, and mineral spirits were added to the paint used in the wet paint booths in Plant 5C to make it less viscous and easier to apply. (Kline, Tr. 9/28/94 at 163-64.)

482. In the wet paint booths, air containing paint exited through the floor and crossed a reservoir of water akin to a swimming pool. (Kline, Tr. 9/28/94 at 156.) Solids settled and formed a sludge at the bottom of the reservoir. (Kline, Tr. 9/28/94 at 165-66.)

483. The water reservoirs beneath the wet paint booths in Plant 5C were cleaned out once every 6-8 weeks. The water was drained to the waste treatment plant, leaving a wet sludge that was shoveled into 55-gallon drums for disposal. (Pirl, Dep. 3/25/93 at 34-35; Kline, Tr. 9/28/94 at 169-71.) The five wet paint booths in Plant 5C collectively generated about 60 drums of sludge during each cleaning. (Pirl, Dep. 3/25/93 at 37; Kline, Tr. 9/28/94 at 173.)

484. Normally, 55-gallon drums containing paint sludge and other paint waste were banded together on pallets, four to a pallet, and transported to a site other than the Dorney Road Landfill. (Kline, Tr. 9/28/94 at 173; Polkowski, Tr. 9/29/94 at 28-31.)

485. The parties have stipulated that, on a number of occasions, 55-gallon drums containing paint booth sludge from wet paint booths found their way into the 40-cubic yard rolloff containers that routinely went to the Site. (TPD 1292 at ¶ 1; see Pirl, Dep. 3/25/93 at 36.)

486. Additionally, liquid paint waste such as residual paint that remained in drums after use, obsolete paint, and paint left over from special color mixes were disposed of at the Site. (TPD 1096; TPD 1097; TPD 1131; Polkowski, Tr. 9/28/94 at

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202-03; Polkowski, Tr. 9/29/94 at 14-15.) Five-gallon cans with dried residue from paint generally were taken to the Site in dump trucks, while drums were placed in the 40-yard rolloff boxes. (Selig, Tr. 9/21/94 at 93-94, 164-65.)

487. The 40-gallon rolloff containers that Mack brought to the Site usually included one or two drums. (Oswald, Tr. 9/21/94 at 52-54; Selig, Tr. 9/21/94 at 95-96.) At times, the 40-yard boxes contained no drums at all. (Oswald, Tr. 9/21/94 at 52.)

488. The drums that Mack disposed of at the Site ranged from half full to completely full. (Oswald, Tr. 9/21/94 at 56.)

489. Of the waste that Mack disposed of at the Site from its Allentown plant, approximately 193.24 tons were comprised of paint sludge and liquid paint waste that was disposed of in 55-gallon drums.

a. Mack hauled 1,121 40-yard rolloff containers to the Site between March 1971 and January 1973. (TPP 839)

b. On average, one drum was included in each 40-yard rolloff container that Mack hauled to the Site. Each drum was about three-quarters full, containing 41.25 gallons of paint sludge or other liquid paint waste.

*53 c. The court will borrow the density factor that was assigned to Third-Party Defendant Stanley-Vidmar's paint sludge, which is 1,688 lbs/cu.yd., and apply it to Mack's paint waste. (TPP 199(a), Attachment 2A.) This is the density that Third-Party Plaintiffs' experts have applied generally to liquid waste. (TPP 960)

d. The court calculates the volume of Mack's paint waste as follows: (1,121 drums x 41.25 gallons/drum) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.) x (1,688 lbs/cu.yd.) x (1 ton/2,000 lbs.)

490. The court accepts the parties' volume stipulation. However, the court's finding regarding the amount of paint sludge necessitates one minor adjustment. The stipulated volume apparently was derived from the Wehren Report and calculated based on the density factors assigned therein to each waste stream. (TPP 199(a) at 5; TPP 199(a),

Attachment 2A.) The court notes that the presence of one 55-gallon drum in each 40-yard box reduces the total space occupied by the loose waste to about 44,535 cubic yards. (44,840 cu.yd. - (55 gal./drum x 1,121 drums) x (1 cu.ft./7.48 gal.) x (1 cu.yd./27 cu.ft.)) Therefore, of the waste transported to the Site from the Mack Allentown plant in 40-yard containers, 5,566.84 tons were comprised of wood pallets and wood packaging. (44,535 cu.yd. x 250 lbs/cu.yd. x 1 ton/2,000 lbs.)

491. Brown and Lowe assigned a waste strength score of '7' to Mack's loose waste, including the empty paint cans and dried paint from the spray booths. (TPP 191) The court finds this score to be appropriate.

492. The appropriate waste strength score to be applied to Mack's paint sludge and other liquid paint waste from the Mack Allentown plant is '19'. This is the score that Brown and Lowe assigned to settled Third-Party Defendant Stanley-Vidmar's paint sludge, which was substantially similar in character to Mack's. (TPP 191)

(b) The Macungie Plant

(i) Plant Trash

493. The parties have stipulated that Mack disposed of 2,190 tons of plant trash from its Macungie plant. (TPD 1292 at ¶ 4.)

494. The parties further have stipulated that Mack's plant trash consisted primarily of wood, paper, and cardboard packaging materials. The plant trash also included smaller quantities of plastic packaging, styrofoam, lunchroom trash, food waste, floor sweepings, metal banding from shipping containers, office trash, filmite coatings from paint booth walls, dry scrapings from paint booth walls, dry paint booth filters, and empty paint and glue cans. (TPD 1292 at ¶ 4; Litzenberger, Tr. 9/29/94 at 104.)

495. The Macungie plant had six dry paint booths in operation during the relevant time period. (Litzenberger, Tr. 9/29/94 at 72.)

496. The dry paint booths utilized filters to catch the paint overspray. (Litzenberger, Tr. 9/29/94 at 72-73.) Each booth had 60-100 filters, depending on the size of the booth. The filters were changed once

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every 5-10 working days. When the filters were changed, all of the used filters containing paint overspray were thrown in with the plant trash. (Litzenberger, Tr. 9/29/94 at 72-73.)

*54 497. On average, about 16,640 used filters were discarded with the plant trash each year. (80 filters/booth x 6 booths/cleaning) x (1 cleaning/7.5 working days) x (5 working days/week) x (52 weeks/year)

498. Brown and Lowe assigned a waste strength score of '7' to Mack's Macungie plant trash. (TPP 191) The court finds this score to be appropriate.

(ii) Liquid Waste

499. Two wet paint booths were in operation at the Macungie plant during the relevant time period. (Litzenberger, Tr. 9/29/94 at 72.) Similar to the wet paint booths at Mack's Allentown plant, each booth at the Macungie plant had a reservoir beneath it where paint overspray and water accumulated. Most excess water from the reservoirs was pumped through the plant's waste water treatment plant. The sludge and water that remained in the paint booth reservoirs was pumped out by a vacuum truck for disposal. (Litzenberger, Tr. 9/29/94 at 74-75.)

500. Thomas Daskalakes ("Daskalakes"), operating as Continental Sanitary Services ("Continental"), a one-truck sanitary septic hauling service, pumped sludge and water from the paint booths with a vacuum truck. (Litzenberger, Tr. 9/29/94 at 86-88.) Continental hauled paint booth sludge from December 1975 until November 1976. (TPD 1292 at ¶ 5; TPD 1125.)

501. Water containing suspended paint pigments from the paint spray and phosphatizing process was processed through a waste water treatment system. The sludge that remained after treatment was collected in a 2,000-gallon holding tank for disposal. Continental hauled the sludge between May 1976 and December 1978. (TPP 1292 at ¶ 5; TPD 1125.)

502. Mack maintained two 1,500-gallon caustic tanks containing sodium hydroxide solution to strip paint overspray from equipment at the Macungie plant. (Litzenberger, Tr. 9/29/94 at 83.) Sludge that accumulated in the caustic tanks was removed by

Continental several times during 1976. (TPP 1292 at ¶ 5; TPD 1125; Litzenberger, Tr. 9/29/94 at 84.)

503. The record does not support a finding that Continental disposed of any of Mack's waste from the Macungie plant at the Site.

a. Continental does not appear in the Selig Log. (TPP 2)

b. Selig testified that Continental used the Site only during the last year that the Site was open. (Selig, Dep. 10/19/92 at 627.) The only substance Continental hauled for Mack during that year was the waste water treatment sludge.

c. Daskalakes testified that the waste treatment sludge was mostly water, with some residue. (Daskalakes, Tr. 9/29/94 at 58.)

d. When Daskalakes did use the Site, he disposed of a brownish-black substance that "looked and smelled like sewage." (Selig, Dep. 10/19/92 at 630.)

e. Daskalakes testified that he could not remember where he took Mack's treatment plant waste. (Daskalakes, Tr. 9/29/94 at 58.)

f. Some evidence was introduced at trial to the effect that, in 1978, Daskalakes told a Mack employee that he was taking waste to the Dorney Road landfill. (Litzenberger, Tr. 9/29/94 at 96, 101-02.) However, without more, the court is constrained to find that Mack's liquid waste went elsewhere.

M. ROBERT J. McAULIFFE

*55 504. Third-Party Defendant Robert J. McAuliffe ("McAuliffe") is an individual who resides at 4816 Timberline Road in Walnutport, Pennsylvania.

505. Beginning in 1955, McAuliffe operated a waste hauling business known as Robert J. McAuliffe Hauling ("McAuliffe Hauling"). (McAuliffe, Dep. 12/6/91 at 7.)

506. McAuliffe began hauling waste to the Site in 1970. (McAuliffe, Dep. 12/6/91 at 18; TPP 2.)

507. As the court noted above, McAuliffe sold part of his hauling business to Gary Allison in September

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1975. (Allison, Tr. 9/27/94 at 75; McAuliffe, Dep. 12/6/91 at 11-12.) After that, McAuliffe stopped hauling waste to the Site. (McAuliffe, Dep. 12/6/91 at 19.)

508. The Selig Log reflects charges to McAuliffe as follows:

| | | |
|--------------------|--------------------------|------------|
| 2/70 - 12/71 | \$ 26,818 @ \$.75/ccy = | |
| | | 35,757 ccy |
| 1/72 - 8/75 | \$ 96,410 @ \$1.00/ccy = | |
| | | 96,410 ccy |
| TOTAL: 132,167 ccy | | |

(TPP 2)

509. Commingled MSW has a density of 660 lbs/cu.yd when compacted in a truck, and 250 lbs/cu.yd when loose. (TPP 960)

510. McAuliffe hauled approximately 43,615 tons of waste to the Site between February 1970 and August 1975. (132,167 ccy x 660 lbs/ccy x 1 ton/2,000 lbs.)

511. A portion of the waste that McAuliffe hauled to the Site was generated by other Third-Party Defendants. Dovell's estimates are as follows:

| | |
|------------------------|------------|
| Altemos Fuel | 696 lcy |
| Bethlehem Suburban | |
| Frey's Service Station | 5,136 lcy |
| McAuliffe Asphalt | 696 lcy |
| Borough of Macungie | 696 lcy |
| | 4,584 lcy |
| TOTAL: | 11,808 lcy |

(TPD 1536) The waste that McAuliffe hauled for the above Third-Party Defendant generators comes to approximately 1,476 tons. (11,808 lcy x 250 lbs/lcy x 1 ton/2,000 lbs.)

over as of September 12, 1975 and continued hauling GE's waste to the Site until December 1978. (Allison, Tr. 9/27/94 at 75.)

512. Additionally, McAuliffe hauled a significant amount of waste to the Site from GE. As the court found above, GE disposed of 16,858.40 tons of waste at the Site. McAuliffe hauled GE's waste from February 1970 through August 1975; Allison took

513. McAuliffe hauled GE's waste for 67 of the 107 months that the waste went to the Site. Thus, McAuliffe hauled about 63% of GE's waste. Accordingly, 10,621 tons of the waste that McAuliffe hauled to the Site is attributable to GE.

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514. McAuliffe hauled approximately 31,518 tons of MSW-type waste from customers who are not parties to this action. [43,615.11 total - (10,621 GE + 1,476 other TPD generators)]

515. Brown and Lowe assigned a waste strength score of '7' to MSW, based on the presence of a wide variety of hazardous substances. (TPP 191) The court finds that this is an appropriate score for the waste that McAuliffe hauled to the Site.

N. SAAB METALS CORPORATION

(1) *Ownership and Operations*

516. Third-Party Defendant Saab Metals Corporation ("Saab Metals") is a corporation incorporated under the laws of the Commonwealth of Pennsylvania.

517. Saab Metals is a scrap metal business located at 2002 South 12th Street in Allentown, Pennsylvania. (Saab, Tr. 10/13/94 at 41.)

*56 518. Fred Saab ("Saab") started the business with his brother, James Saab, in 1964. James Saab is now deceased. The business was incorporated in 1969 under the name Saab Metals Corporation. (Saab, Tr. 10/13/94 at 42.) Fred Saab changed his surname from "Saby" to "Saab" in 1958. (Saab, Tr. 10/13/94 at 62.)

519. Saab's brother Henry Saby, also known as Sam Saby ("Saby"), now deceased, worked for Saab Metals from approximately 1969 until 1973. (Saab, Tr. 10/13/94 at 50-51; see Selig, Tr. 12/8/93 at 185-86.) Saby left Saab Metals under tense circumstances and thereafter had very little, if any, contact with his brother Fred. (Saab, Tr. 10/13/94 at 52-54, 58.)

520. Since its inception, Saab Metals has been in the business of buying and selling scrap metal and batteries. (Saab, Tr. 10/13/94 at 43.)

521. During the relevant time period, Saab Metals would buy batteries, dismantle the batteries, and sell the pieces to smelters. (Saab, Tr. 10/13/94 at 43-44.) The price that the smelters paid for the dismantled batteries depended on the batteries' lead content. (Saab, Tr. 10/13/94 at 48-50.)

522. Saab Metals had a battery breaking process similar to that employed at East Penn's on-site smelter. (Saab, Tr. 10/13/94 at 62-63.) The process included a mechanism for breaking battery casings into small pieces, about one inch by two inches in size, which were sometimes referred to as "pucks." (Saab, Tr. 10/13/94 at 64.) Once the batteries were dismantled, all of the component parts would be sold to smelters including the casings, which could be used as fuel. (Saab, Tr. 10/13/94 at 45-46; see Wojton, Tr. 8/2/94 at 45.)

(2) *Use of the Dorney Road Landfill*

523. Oswald and Selig testified that a driver whom they knew as Sam Saby regularly brought uncrushed battery casings to the Site from around 1972 or 1973 until 1977 or 1978. (Oswald, Tr. 12/8/93 at 90-93, 109-11; Selig, Tr. 10/20/94 at 42-44.) Saby never brought crushed battery casings to the Site. (Selig, Tr. 10/20/94 at 47.)

524. No entries for Saby or Saab Metals appear in the Mabry Log or the Selig Log. (TPP 3; TPP 2.) The landfill operators did not charge Saby for dumping the battery casings because they were able to use the casings to build a road of sorts. (Oswald, Tr. 12/8/93 at 111; Selig, Tr. 10/20/94 at 43.)

525. Saab testified that Saab Metals never disposed of whole or broken battery casings as waste. (Saab, Tr. 10/13/94 at 45.)

526. Saby apparently started his own business, called "Sam's Junk Batteries," some time after he left Saab Metals. (SAAB 2; SAAB 3; Saab, Tr. 10/13/94 at 53-55.)

527. The court finds that the uncrushed battery casings that Saby brought to the Site were not from Saab Metals, but more likely were from Saby's own business.

528. Saby disposed of approximately 3,510 tons of battery casings at the Site, based on the following:

*57 a. Saby brought loads of battery casings to the Site three to five times each week. (Oswald, Tr. 12/8/93 at 92-93, 111; Selig, Tr. 12/8/93 at 185.) He brought at least one load each time, occasionally two. (Selig, Tr. 12/8/93 at 185.) The court estimates that Saby hauled six loads of casings to the

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Site per week.

b. Saby hauled battery casings in an unmarked, 8-10 cubic yard, red dump truck. (Selig, Tr. 12/8/93 at 185-86.)

c. Saby hauled battery casings to the Site for about five years. (Oswald, Tr. 12/8/93 at 90-93, 109-11; Selig, Tr. 10/20/94 at 42-44.)

d. The battery casings had a density of 500 lbs/cu.yd. (TPP 199(a), Attachment 2A.)

e. The court's calculation of the volume of Saby's battery casings is as follows: total tons = 6 loads/week x 52 weeks/year x 5 years x 9 cu.yd./load x 500 lbs/cu.yd. x 1 ton/2,000 lbs.

529. The court has been presented with no evidence from which it can determine the exact concentration of lead found in Saby's battery casings. Accordingly, the court will assume that, like the battery casings that East Penn disposed of at the Site, Saby's battery casings probably contained at least 0.5% residual lead.

O. SAUCONY SHOE MANUFACTURING COMPANY, INC.

(1) *Ownership and Operations*

530. Third-Party Defendant Saucony Shoe Manufacturing Co., Inc. ("Saucony II") is a corporation incorporated under the laws of the Commonwealth of Pennsylvania. (TPP 903(b), tab 3.)

531. Saucony Shoe Manufacturing Company ("Saucony I") was incorporated under the laws of the Commonwealth of Pennsylvania on January 21, 1902. (TPP 903(b), tab 17.) Saucony I was dissolved on October 14, 1969. (TPP 903(b), tab 17.) Saucony I operated a boot and shoe manufacturing business at 12 Peach Street in Kutztown, Pennsylvania (the "Kutztown plant"). (TPP 903(b), tab 17.)

532. K & B Shoe Co., Inc. ("K & B") was incorporated under the laws of the Commonwealth of Pennsylvania on April 13, 1956. (TPP 903(b), tab 18.) K & B was dissolved on October 14, 1969. (TPP 903(b), tab 18.) K & B operated a shoe

manufacturing business at 55 Lehigh Street in Macungie, Pennsylvania (the "Macungie facility"). (TPP 903(b), tab 18.)

533. On June 13, 1968, Saucony I, K & B, and A. R. Hyde & Sons Company ("Hyde") executed an Agreement of Sale (the "Agreement") under which Hyde, or a nominee corporation, would purchase all of the assets of Saucony I and K & B. (TPP 903(b), tab 1; see TPP 903(b), tab 2 at ¶ 5 (supplemental agreement of sale wherein misidentification of Saucony I in original agreement is corrected).)

534. Hyde or its nominee agreed to assume certain liabilities of Saucony I and K & B as of June 15, 1968. However, the Agreement did not specify that Hyde or its nominee would assume liability arising from environmental damage. (TPP 903(b), tab 1.)

535. Saucony II was incorporated on July 29, 1968. Hyde was the sole shareholder. (TPP 903(b), tab 3.)

*58 536. On October 24, 1968, the asset purchase was completed. Saucony II, as the nominee of Hyde, took title to all transferred assets and assumed the liabilities described in the Agreement. (TPP 903(b), tab 9.)

537. Hyde did not purchase any of the stock of either Saucony I or K & B. (TPP 903(b), tab 9.)

538. The asset purchase was for cash; Saucony and K & B did not acquire any ownership interest in Hyde or Saucony II in connection with the Agreement. (TPP 903(b), tab 1, tab 9.)

539. Hyde assumed "supervision and control of the business and assets of Saucony [I] and K & B" as of September 4, 1968. (TPP 903(b), tab 2.)

540. Shortly after the asset purchase was completed, Russell Thies took control of the Kutztown plant. (Adam, Tr. 7/12/94 at 34.) This was the only significant management change at the Kutztown plant. The plant superintendent and the supervisory staff did not change after the asset purchase. (Adam, Tr. 7/12/94 at 35.)

541. The Kutztown plant continued to utilize the same manufacturing process after the asset purchase. (Adam, Tr. 7/12/94 at 35.)